DOCUMENT RESUME

ED 365 554 SE 054 042

TITLE	Rethinking Recycling: An Oregon Waste Reduction Curriculum. Teacher Resource Guide.
INSTITUTION	Oregon State Dept. of Environmental Quality, Portland.
PUB DATE	Oct 93
NOTE	188p.
AVAILABLE FROM	Oregon Department of Environmental Quality, 811 S.W., Sixth Avenue, Portland, OR 97204.
PUB TYPE	Guides - Classroom Use - Teaching Guides (For Teacher) (052)
EDRS PRICE	MF01/PC08 Plus Postage.
DESCRIPTORS	Annotated Bibliographies; *Educational Resources; Elementary Secondary Education; *Environmental Education; Instructional Materials; *Recycling; Solid Wastes; State Curriculum Guides; Teaching Guides; *Waste Disposal
IDENTIFIERS	Environmental Problems; *Oregon

ABSTRACT

In 1993, the Oregon State Department of Education, in conjunction with the Department of Environmental Quality (DEQ), developed four "Classroom Activity Packets" with waste reduction and recycling lessons for each of the following groups: Grades K-2; Grades 3-5; Grades 6-8; and Grades 9-12. This teacher resource guide is the final component of that curriculum and includes information on the content goals in waste reduction education and methods to help teacher integrate instruction to meet those goals in daily classroom lessons. The guide is presented in five sections. Section 1 provides an overview of the new materials that includes educational objectives, a cross-reference to statewide curriculum goals, and a list of materials in the activity packets. Section 2 presents a history of the problem of waste, the Oregon hierarchy of solutions, and special waste reduction concerns, Section 3 discusses the teaching methods that include making use of technology, games, simulations, and parental and community involvement. Exemplary programs are recognized. Section 4 presents programs to supplement the implementation of the curriculum that include an awareness week, a classroom resource center, and plays and songs. Section 5 lists the following resources: (1) a Statewide Environmental Education Hotline; (2) facts and figures about trash; (3) a glossary of 185 terms; (4) local resources listed by County; (5) a list of DEQ resources; and (6) an annotated bibliography of selected associations, children's books, curricula and activity guides, and resource books. (MDH)

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rethinking recycling: an oregon waste reduction curriculum

ED 365 554

teacher resource guide

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the big picture

Section One: The Big Picture

To The Teacher: Introduction and Acknowledgements
Overview of new materials:

- Oregon Schools Formula for Success in Waste Reduction - a handbook
- Classroom Activity Packets
  - List of objectives/concepts to be mastered at each grade level
  - Cross-reference to statewide curriculum goals
  - List of Handouts, Transparencies, Worksheets and Audiovisual Materials included in the Activity Packets (K-2, 3-5, 6-8 and 9-12)
- Teacher Resource Guide
- User Evaluation Survey
- Materials Order Form

To The Teacher:

This Teacher Resource Guide is one component in the 1993 revision of

Rethinking Recycling. . . an Oregon Waste Reduction Curriculum

It is designed to give you hands-on access to the methods, ideas, resources, and content information that will allow you to teach concepts of waste management and related environmental issues to your students. The other components of the curriculum are described in **Section One: The Big Picture**. Please review that section and complete the order form if you have not received the other components you need to be successful in your efforts to teach about the topics in this Guide.

Since the field of waste management and its component topics is changing rapidly due to recent legislation, improving technology, public awareness, and on-going educational efforts, this Guide and the other elements of Rethinking Recycling will be constantly undergoing change. Please help contribute to this change by completing the User Evaluation Survey in **Section One** and returning it to Department of Environmental Quality (DEQ) Public Affairs, 811 SW Sixth, Portland, OR 97204-1390. If you find it easier to contribute by making a quick telephone call, please be sure to call (503) 229-6709 in Portland (1-800-452-4011 in Oregon, outside Portland), or (503) 229-6993 TDD. Also, if you or your students need to receive these materials in an alternate format due to a disability, please contact DEQ Public Affairs at (503) 229-5317.

We recognize the extra effort teachers make to provide Oregon's students with an excellent education, and thank you for all that you do. If we can assist you in any way as you endeavor to teach your students about Oregon's environment, please be sure to contact us.

This Guide and the other components of the curriculum were written and compiled by Happi T. Hansen, Education Coordinator, DEQ Public Affairs. The list of people, organizations, and materials that contributed to this effort is extensive. We would, however, especially like to acknowledge the following for their contributions:

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(work used to illustrate curriculum)

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Amity Griffin, 8th Grade, Fern Ridge Middle School, Veneta (4-8 2nd Place Tie)
Lesley Johnson's 3rd Grade Class, Middle Grove Elementary, Salem (K-3 1st Place Tie)
Hally Kenney, Freshman, Arlington High School, Arlington (9-12 Slogan 2nd Place)
Lindsey Maser & Christie Summers, 8th Grade, LaCreole Jr. High School, Dallas (4-8 2nd Place Tie)
Eric Nguyen, 6th grade, George Middle School, Portland (4-8 1st Place)
Ryan Pence, Senior, Heppner High School, Heppner (9-12 Graphics 2nd Place)
Rachelle Purple, 3rd Grade, Farmington View Elementary, Hillsboro (K-3 Honorable Mention)
Charis Reimer, 8th Grade, LaCreole Jr. High School, Dallas (4-8 Honorable Mention Tie)
Dee Robinson, Freshman, Arlington High School, Arlington (9-12 Slogan 1st Place)
Danie Sanday, Heppner High School, Heppner (9-12 Graphics 1st Place, Slogans Honorable Mention)
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Debra Herzog, Elk Trail School, Trail
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Curriculum Resources

There are many excellent curricula available in the area of Waste Management that are listed in the bibliography (**Section Five: The Resources**) of the Teacher Resource Guide. However, we owe a great deal to the following who willingly gave us permission to adapt activities from their materials for this version of Rethinking Recycling:

- Alameda County Office of Education, California State Environmental Education Guide (1988)
- Association of Vermont Recyclers, Teacher's Resource Guide (1989), and Teaching Toxics (1992)
- California Department of Health Services Toxic Substances Control Program, The No Waste Anthology (1991)
- Environmental Protection Agency, Let's Reduce and Recycle: Curriculum for Solid Waste Awareness (1990 Revision)
- Mary K. King, Earth Aid First Aid (1992)
- Kraft General Foods Environmental Institute, Solid Thinking About Solid Waste (1992)
- North American Association for Environmental Education, Educational Issues Forums The Solid Waste Mess: What Should We Do With the Garbage (1992)
- The San Francisco Recycling Program, The 4th R Recycling Curriculum (1988)
- Washington Department of Ecology, A Way With Waste (1990)

A special thanks to the schools who responded to the first-ever Oregon Schools Waste Reduction Program Survey. Their responses contributed tremendously to the final development of the Oregon Schools' Formula for Success in Waste Reduction component of the curriculum.

and in supporting roles. . .

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Overview and Background of New Materials

What is Oregon Doing About Recycling Education?

Individual citizen action is a pre-requisite to effective solid waste management. If, as a state, we are to recover 50% of our waste materials by the year 2000, every individual will need to change habits of consumption (reduce the amount of waste they generate and reuse everything they can) and disposal (recycle everything for which there is a market, compost appropriate materials, and recover energy from incinerating or landfilling remaining wastes). A strong education and promotion component in the 1991 Recycling Act is proof of the state's conviction that an informed populace will take part willingly in recycling and waste reduction activities. This component is designed to educate Oregon citizens about the importance of the environment and its protection to the future of our economy, our quality of life, and our future opportunities.

The best way to ensure that these changes in behavior take place is to educate every individual regarding the importance of waste reduction and the impact of individual behaviors on the total waste stream. As teachers everywhere know, the best place to begin to change behavior in the community is to educate the children about the changes that need to be made. Students will then take the message home to family members, who soon take the knowledge to their own workplaces and community organizations. To ensure that this educational process takes place, the 1991 Oregon Recycling Act requires specific actions. These education-related activities include:

- Integrate a recycling and waste reduction component into a required curriculum for all Oregon students in grades Kindergarten through 12.
- Provide statewide promotion, education and technical assistance to local government units and schools in each wasteshed to increase participation in recycling.
- Develop a current teacher's guide to be supplied to every school in the state.
- Provide teacher inservice workshops to present and facilitate the use of the material.
- Provide professionally produced information materials including but not limited to camera-ready art and copy for use by local governments, schools or educators to provide public information.
- Provide two annual workshops on recycling and waste reduction education and promotion each year, one inside and one outside the Portland Metro area.
- Provide professionally produced, grade-level appropriate instructional audiovisual materials to each school in the state to be used as part of the instructional program.
- Report to the Legislature on the development and implementation of the integrated solid waste management curriculum and recycling and waste reduction education component established in Senate Bill 66.

In order to accomplish the education and promotion section of the act 1991 Recycling Act, DEQ and DOE curriculum office representatives first held meetings to review the K-12 curriculum goals requirement and discuss strategies for making necessary and appropriate changes. Because of legislation passed in 1991 to reform Oregon schools, (The New Schools for the 21st Century Act or HB 3565), state-level curriculum coordinators are working to infuse waste reduction and recycling concepts into revision of the common curriculum goals being completed to provide curriculum frameworks for the 21st Century Schools.

In the summer and fall of 1992, DEQ's Public Affairs Education Coordinator conducted a review of the 1986 curriculum (RE:THINKING RECYCLING), including surveying teachers and others who had used the existing materials, facilitating individual and group brainstorming regarding the "ideal" curriculum, and convening an advisory group to review decisions and drafts of the new curriculum. In addition, DEQ reviewed the waste reduction and recycling curriculum materials currently available from other states, professional organizations and private companies to determine the relative merits of adapting existing materials versus developing new materials for use by Oregon teachers.

Based on the recommendations of the curriculum advisory group and teachers who responded to the survey, DEQ staff made a number of decisions to guide the format and content of the new curriculum. These decisions included:

- develop new materials that are modular in format and easily accessible by classroom teachers and school recycling program personnel to teach recycling concepts in the classroom
- develop materials to encourage the establishment of effective waste reduction and recycling programs in individual school buildings
- develop or purchase audiovisual materials to support the lessons

The Formula

The first component of the new curriculum to be developed was a handbook entitled Oregon Schools' Formula for Success in Waste Reduction. This piece took precedence for two reasons. First, teaching waste reduction and recycling skills requires a heavy hands-on component. If the school building in which students are located does not have an active and effective recycling program, the hands-on, real-world learning laboratory is missing. Secondly, since the need for assistance to develop school recycling programs was the most common request from teachers and other survey respondents, it was determined that many schools would find it difficult to provide the necessary hands-on learning without some assistance in developing the building-level recycling program. In February 1993, this new piece was distributed to teachers and school personnel who had indicated a desire to assist in the development effort by field testing materials in their schools. Once feedback was received from these field test sites, necessary changes were incorporated. This handbook was printed in May 1993, and distributed to every school in the state in September 1993.

The Classroom Activity Packets

The next materials to be developed were four Classroom Activity Packets with waste reduction and recycling lessons for each of the following groups: Grades K-2; Grades 3-5; Grades 6-8; and Grades 9-12. These activities are designed to be distributed in a folder for each grade level grouping, which allows insertion of overhead transparencies, posters, or other resource material as it is made available. Handouts, overhead transparency masters, worksheets, and resource material is included for each of 12 lessons at each grade level.

In addition to the user survey of the previous curriculum, a request for activities was distributed through Clearing Magazine in January 1993 in an effort to gather ideas from teachers about the most popular activities to include in these packets.

Since there are literally hundreds of activities currently available through various published curricula, few new activities were developed for these packets. Rather, the activities included could be considered the "core" ideas of waste reduction and recycling education at each level. Activities in the packets will be supplemented each year when new activities or suggestions are distributed for the state's annual Recycling Awareness Week (which runs from the first to the second Saturday in October), or when teachers attend conferences or inservice workshops on subjects related to waste reduction and recycling.

The field test version of the packets was distributed for "tryout" in May 1993, suggestions were incorporated and the packets printed during the summer. Each of the four Classroom Activity Packets are packaged and available separately. Individual teachers may want to order packets at more than one grade level, depending on their classroom situation. The classroom activities are designed to cover the range of information important to teaching about waste management topics, but are not designed to be comprehensive in nature.

Cross-Reference to Statewide Curriculum Goals

At the time this curriculum went to press in the summer of 1993, the Oregon State Department of Education was in the process of a major educational reform program under the auspices of House Bill 3565, The Oregon Schools for the 21st Century Act. As a part of this process, the common curriculum goals that have guided educational planning for the state in the past were undergoing major revisions to align them with the new Foundations and Core Applications of Learning outlined for the Certificate of Initial Mastery and with the six Endorsement Areas mandated for the Certificate of Advanced Mastery. As a result, the Oregon Departments of Environmental Quality and Education decided to provide the matrix for the Rethinking Recycling Curriculum as soon as they are available UNDER THE NEW GUIDELINES. If you have received this curriculum and the matrix does not appear on the next page, please call DEQ Public Affairs at (503) 229-6709 or 1-800-452-4011 inside Oregon, outside Portland, and we will add your name and mailing address to our database to receive the matrix as soon as it is available. Thanks for your patience.

Activity Objectives

Grades K-2

Lesson 1: A Lot of Garbage **Students will:**

- define and give examples of solid waste
- identify the amount of solid waste produced at school and at home
- calculate amounts of waste for various individuals and groups over varying time periods

Lesson 2: There is No Away **Students will:**

- Increase their awareness of the sources of waste
- Recognize that their is no "away" in "throw it away"

- Identify the destination of the waste they generate at home and at school

Lesson 3: Trash or Treasure **Students will:**

- know the difference between natural resources and manufactured items
- list some of the natural resources used to produce various objects
- recognize that some items that are thrown away could be used as resources

Lesson 4: Natural Cycles **Students will:**

- be able to identify, compare and evaluate cycles
- recognize cycles in nature
- identify recycling as a cycle that can help conserve natural resources

Lesson 5: Wants and Needs **Students will:**

- discriminate between wants and needs, quantity and quality, necessities and luxuries
- evaluate their own motives for buying things
- recognize and draw conclusions about long-term consequences of their own consumption habits

Lesson 6: One More Time Around **Students will:**

- recognize the many things that can be saved and reused
- see that trading or re-selling are good alternatives to throwing away
- discuss the disposable "throwaway society" concept and how reusing can help the environment

Lesson 7: The Way the Worms and Bugs Do It **Students will:**

- observe and discuss the role of bugs and worms as nature's own recyclers

Lesson 8: Recycle Lifecycle **Students will:**

- define the word recycle
- describe the process that is followed to recycle aluminum and steel cans, glass, paper, and plastic beverage/milk bottles
- explain and find examples of the recycling symbol
- review the resources used to make recyclable products
- identify recyclable products as resources
- recognize products made from recycled materials

Lesson 9: Poison Products **Students will:**

- identify what types of household products are toxic or hazardous
- identify where in the home they typically find hazardous items
- recognize that toxic materials are hazardous to the earth as well as to people

Lesson 10: Warning Words **Students will:**

- recognize signal words and visual symbols that indicate the presence of hazardous substances
- identify "how much" of various products would be dangerous to people or to the earth
- make a commitment to avoid hazardous products and choose less toxic alternatives whenever possible

Lesson 11: Sorting Stuff **Students will:**

- realize materials must be sorted to be recycled
- understand how to prepare items for recycling
- practice sorting and preparing materials for recycling at school

Lesson 12: Home Habits **Students will:**

- teach family members about recycling
- make signs to assist family members in sorting and preparing recyclable materials
- practice sorting and preparing recyclable materials at home

Lesson 1: The Problem With Garbage **Students will:**
- realize how much waste they generate
- project the size of the waste problem based on their own waste habits
- recognize historical methods of waste management
- explore alternatives to current waste issues

Lesson 2: Nature's Way **Students will:**
- review characteristics or properties of waste
- recognize the relationships of natural cycles and natural resources

Lesson 3: Human's Way **Students will:**
- recognize that through manufacturing items for our use, people have altered nature's way of utilizing resources
- identify the energy requirements and environmental costs of manufacturing
- review the raw materials necessary to manufacture products that are typically part of the waste stream
- recognize that people must reduce consumption of natural resources and/or recycle materials in order to reduce the impact on the environment

Lesson 4: Oregon's Way **Students will:**
- recognize Oregon's accomplishments in environmental issues and waste management
- realize there are further opportunities to improve our state's management of solid waste
- identify Oregon's waste management hierarchy

Lesson 5: More than one way: packaging and plastics **Students will:**
- recognize the reasons for and costs of packaging in total product cost
- review the process of manufacturing plastics
- assess the difficulties and costs involved in disposing of or recycling plastics
- discuss the impact of trends toward increased use of plastics in products and packaging
- identify alternatives to plastics and packaging for various products

Lesson 6: Packaging: The good, the bad and the ugly! **Students will:**
- recognize the contribution of packaging and disposables to our waste management problem
- identify various factors that have led to overpackaging
- discuss ways to balance the needs for product protection and safety with environmental sensitivity in packaging

Lesson 7: Buyer's Choice **Students will:**
- assess the factors that affect consumer purchases
- identify ways to reduce the amount of waste and environmental impact through responsible consumer choices

Lesson 8: Consumer Choice: The Power of The People **Students will:**
- determine the availability of products made from recycled materials in the marketplace
- recognize the power consumers have to change the marketplace by creating demand for recycled products
- identify consumer actions that will help achieve Oregon's waste reduction goals

Lesson 9: Confusing the Issue: Hazards of Household Products **Students will:**
- recognize the hazards of typical household products
- identify alternatives to household hazardous products
- define the terms that identify hazardous products
- identify appropriate disposal techniques for household hazardous wastes

Lesson 10: To Market, To Market: Choosing to Buy Recycled **Students will:**
- recognize the role consumers play in closing the loop by purchasing recycled products

- gather information about their families' and communities' recycling attitudes and habits
- design and carry out a program to share information about consumer roles in effective recycling

Lesson 11: Safe Choices **Students will**:
- recognize the characteristics that make typical household products hazardous
- define terms related to household hazardous waste
- identify alternatives to hazardous household products

Lesson 12: Handle With Care **Students will:**
- recognize their responsibility for safe disposal of household hazardous waste
- inventory hazardous products in their own home and recommend safe disposal choices

Grades 6-8

Lesson 1: Amazing Connections: A World-view of Waste **Students will:**
- realize the amount and types of waste produced in Oregon
- compare the size of the world-wide waste problem based with local waste habits
- recognize historical methods of waste management and their limitations
- explore alternatives to current waste management methods

Lesson 2: Making Choices: Who is Responsible? **Students will:**
- examine how each individual's perception of a problem affects their response to that problem using solid waste as an example
- explore the individual's, community members' and government's responsibility in solving social problems
- define ways they, acting as individuals or in groups, can take responsibility for solutions

Lesson 3: Weighing Alternatives: What are the real costs? **Students will:**
- assess the relative importance of various criteria affecting solid waste issues
- research facts and data to be considered in making decisions about solid waste management
- evaluate waste management alternatives using selected criteria

Lesson 4: Setting Priorities: Oregon's Waste Management Hierarchy **Students will:**
- identify Oregon's waste management hierarchy and its impact on local waste management choices
- assess local options in waste management given the state and class members' priorities
- explore specific activities that will help meet each of the Oregon hierarchy goals

Lesson 5: More Than One Way: Packaging and Plastics **Students will:**
- recognize the reasons for and costs of packaging in total product cost
- review the process of manufacturing plastics
- assess the difficulties and costs involved in disposing of or recycling plastics
- discuss the impact of trends toward increased use of plastics in products and packaging
- identify alternatives to plastics and packaging for various products

Lesson 6: Worms at Work **Students will:**
- recognize the role of composting and vermiculture in reducing the waste stream
- produce usable compost

Lesson 7: What's My Line? Careers That Help Solve Problems **Students will:**
- explore the work/career options involved in/related to waste management

Lesson 8: Consumer Choice: The Power of the People **Students will:**
- determine the availability of products made from recycled materials in the marketplace
- recognize the power consumers have to change the marketplace by creating demand for recycled products
- identify consumer actions that will help achieve Oregon's waste reduction goals

Lesson 9: Confusing the Issue: Hazards of Household Products **Students will:**

- recognize the hazards of typical household products
- identify alternatives to household hazardous products
- define the terms that identify hazardous products
- identify appropriate disposal techniques for household hazardous wastes

Lesson 11: I am only one: having a voice **Students will**:

- assess their own contributions to waste stream reduction efforts
- identify specific personal actions that will further contribute to waste stream reduction
- calculate environmental/energy savings resulting from personal actions
- commit to taking further personal actions to reduce the waste stream

Lesson 10: Hazardous Decisions: Industrial Waste in Your Community **Students will:**

- recognize typical industrial hazardous waste
- identify hazardous wastes created in a typical manufacturing process
- research hazardous wastes generated in their own community

Lesson 12: Future Focus: What Will Your World Be? **Students will:**

- recognize the worldwide implications of uncontrolled use of natural resources
- identify ways to reduce the impact of human behavior on natural resources and the world of the future

Grades 9-12

Lesson 1: The Problem with Garbage **Students will**:

- discuss the problems associated with waste
- recognize that each of us contributes to these problems
- identify ways that individuals can help solve waste problems

Lesson 2: Identifying the Alternatives **Students will:**

- discuss solutions to the garbage problem from various times and locations
- list current alternatives for dealing with waste management.

Lesson 3: Assessing the Issues **Students will:**

- define, compare and contrast the terms "problem", "issue", "position", "player", "beliefs", "values", and "risks" as they relate to solid waste
- analyze the relationships between and among various solid waste issues

Lesson 4: Reclaiming Our Garbage: Making a Silk Purse from a Sow's Ear **Students will:**

- analyze recycling as a way to solve the solid waste problem
- assess the potential of recycling as a way to use fewer resources and save money, as well as extend the lifetime of available resources

Lesson 5: Changing Our Way of Life: Eliminating the Throwaway Society **Students will:**

- analyze waste reduction (source reduction) and its viability as a way to address the solid waste problem
- assess the effects of a fundamental change in materialism on contemporary society

Lesson 6: Perfecting Our Disposal Methods: Using the Best Technology **Students will:**

- review current disposal technology
- assess the effectiveness of incineration, landfilling and other technologies for managing and disposing of waste

Lesson 7: The Informed Public: A Simulation Game **Students will:**

- apply their knowledge of solid waste management alternatives to solve a real-world problem
- recognize the wide range of perspectives and values involved in solid waste decision-making
- participate in an interdisciplinary decision-making process through role-play and simulation

Lesson 8: The Oregon Solution: The 1991 Oregon Recycling Act **Students will:**

- identify the objectives and priorities of the 1991 Oregon Recycling Act
- recognize the potential impact of reduction and reuse activities on waste generation
- develop informational materials to educate family and others about Oregon's priorities

Lesson 9: Environmental Connections: A Hazardous Picture **Students will:**

- name some potentially hazardous chemicals found in household products
- identify threats to health posed by household hazardous chemicals
- identify environmental consequences of household hazardous waste disposal methods
- recognize priorities for use of hazardous household products

Lesson 10: Environmental Protection: Activism or Stewardship **Students will:**

- identify and give examples of various types of environmental action
- define terms related to environmental action
- assess their personal commitment to responsible environmental behavior

Lesson 11: Careers in Environmental Management **Students will**:

- identify career opportunities in environmental management and protection
- research trade magazines and professional publications for career information
- conduct an information interview with an environmental professional

Lesson 12: "Unless someone like you cares a whole awful lot, nothing is going to get better. It's Not."*: Individual Citizen Responsibility **Students will:**

- Evaluate their personal attitudes, values, beliefs about the environment
- Review impact of personal actions on environment
- Set and achieve goals for personal action

* Quote from The Lorax by Dr. Seuss

The Teacher Resource Guide

The final print component of the curriculum is this Teacher Resource Guide, which includes information on the content goals tin waste reduction education and methods to help teachers integrate instruction to meet those goals in daily classroom lessons. The Resource Guide also includes ideas and resources appropriate to an interdisciplinary topic like waste reduction, suggestions to help teachers master the skills required by the 21st Century Schools Act for multi-disciplinary teaching, and work with multi-age groups of students. Among other things, the Resource Guide contains fact sheets about various solid waste and recycling issues, annotated bibliographies of print, audiovisual and field site resources available, and information on sources to acquire hands-on examples of recycled products for use in the classroom.

To assist teachers in bringing the sights and sounds of solid waste and recycling into their classrooms, DEQ identified a core set of videos to make available at the local level (either through the Educational Service District Media Center and/or the county solid waste office) to support classroom instruction. In addition to some commercially available videos, DEQ has produced a video on waste reduction and recycling in Oregon, a short public service announcement on household hazardous waste, and individual videos regarding the lifecycle (initial production, purchase, separating/recycling, remanufacturing and repurchase) of typical recycled products that can be made available for use in the classroom.

Another activity sponsored by DEQ to help teachers as they educate students about waste reduction and recycling is a statewide recycling art contest held in conjunction with Recycling Awareness Week. In 1992, entries were received from 181 students throughout the state, and DEQ used the

artwork submitted to help illustrate the teachers guide, classroom activity packets, and school handbook described above.

As you use the Rethinking Recycling . . . an Oregon Waste Reduction Curriculum materials, please be sure to submit written or verbal feedback. The revision and updating process is only just beginning. A review sheet for each component of the curriculum is included following this section of this Teacher Resource Guide. Please complete and return it or call DEQ Public Affairs at (503) 229-6709, (1-800-452-4011 inside Oregon) with your suggestions, reactions, comments, commendations, etc. If you received this Teacher Resource Guide without receiving the other components of the curriculum, call DEQ or complete the Rethinking Recycling Curriculum Order form following the User Survey.

Thanks for your interest in preserving Oregon's environment and in teaching students how to reduce the waste they generate, reuse anything they can, and recycle everything for which there is a market. Changes come in small steps, and each of us can make a significant impact on the future of our environment.

Master Resource List for Classroom Activity Packets

Transparency Masters

• What's In Our Garbage?	ALL
• There is No Away	K-2
• Cycles	K-2
• Recycling Symbol (and/or HWR)	K-2, 3-5
• Mr. Yuk/Poison Symbols	K-2
• Sorting Guidelines (and/or HWR)	K-2, 3-5
• Resource Tree (and/or HWR)	3-5
• Glass Manufacturing	3-5
• Paper Production	3-5
• Aluminum Can Manufacturing	3-5
• Tin Can Manufacturing	3-5
• Plastic Manufacturing	3-5
• Just the Facts	3-5, 6-8
• How long does it take our garbage to decompose. . .	3-5
• HHW Fact-Sheet	3-5, 6-8, 9-12
• Hazardous Warnings	3-5, 6-8, 9-12
• How Dangerous?	3-5
• HHW Characteristics	3-5, 6-8, 9-12
• Worldwide Trash	6-8
• Responsibility Matrix (and/or HWR)	6-8
• Oregon's Way to Reduce Waste (1991 Recycling Act Summary)	3-5, 6-8, 9-12
• Oregon's Waste Management History	6-8
• Toxicity Chart	6-8, 9-12
• Industrial Wastes	6-8
• Garbage Alternatives: A Summary	9-12
• Garbage Problems!	9-12
• Current Technology--Oregon Summaries	9-12
• Landfill Regulations	9-12
• Landfill Model	9-12
• Incinerator Regulations	9-12
• Incinerator Model	9-12
• Routes to the Environment	9-12

Handouts/Worksheets/Instructions, etc.

• Parent Letter, Parent Letter-Household Hazardous Waste	ALL
• Garbage Data Form	ALL
• Resources	K-2
• The Cycle Game Instructions	K-2
• Wants/Needs Evaluation Chart	K-2
• Instructions/Resources for Worm Bins/Mini-compost Heap	K-2, 3-5, 6-8
• Recycle Lifecycle	K-2
• Poison Products	K-2
• My Family Can Recycle	K-2
• Natural Resources and Recyclables	3-5
• Products and Their Resources	3-5
• Product Packaging	3-5
• Sample Badge/Certificate	3-5

• Needs and Wants Activity Cards/Instructions	3-5
• Donation Request Sample Letter	3-5
• Sample Surveys, Consumer/Retail Survey Questions/Tally Sheets	3-5, 6-8
• Hazardous Products Alternatives	3-5
• HHW Disposal Game Materials	3-5
• HHW Inventory Sheet	3-5
• Solid Waste Decision Criteria	6-8
• Waste Management in Pleasant County Simulation Materials	6-8
• Packaging Costs	6-8
• Container Packaging Trends	6-8
• Career Information Resources	6-8, 9-12
• Environmental Information Resources	6-8, 9-12
• Bicycle Material, Wastes and By-Products Diagram	6-8
• Hazardous Waste in Your Community	6-8
• Businesses that Generate Hazardous Waste	6-8
• How Do You Stack Up (Survey)	6-8
• My Waste Stream Contributions	6-8, 9-12
• My Personal Action Commitment	6-8
• My Twenty-foot Swath	6-8, 9-12
• Instructions for Finite Resources Game	6-8
• Resource List	6-8
• Environmental Issues Forum Solutions	9-12
• Journal Guidelines	9-12
• Energy and Resources	9-12
• Economics of Recycling	9-12
• Simulation Resource Packet	9-12
• HHW Product Disposal Recommendations	9-12
• Reducing Exposure to Hazards in the Home	9-12
• Hazardous Substances Worksheet	9-12
• Suggested Resources on Student Action	9-12
• Idea List - Environmental Management Careers	9-12
• Information Interview Form	6-8, 9-12
• Environmental Reading List	9-12

Audio-Visual or Library Resources

• Recycle Lifecycle: School Paper, Steel Cans, Glass Containers	ALL
• The Wonderful World of Recycle	K-2
• Mr. Yuk Stickers/Materials	K-2
• Time's a Wasting: Garbage and Recycling in Oregon	3-5, 6-8, 9-12
• Recycled Products Purchasing Directory	3-5
• Waste Not, Want Not	6-8, 9-12
• The Rotten Truth	3-5, 6-8, 9-12
• The Lorax (Video or Book) (See ordering information in the Teacher Resource Guide if this is not available through your local library.)	K-2, 9-12

Rethinking Recycling Curriculum
User Evaluation Survey

Return completed form to DEQ Public Affairs, 811 SW 6th, Portland, OR 97204 or call (503) 229-6709 or 1-800-452-4011.

Name_____
Organization_____
Address_____
Telephone/Best hours to Contact_____

Please answer the following questions about the Rethinking Recycling curriculum components you have used. Please be sure to attach comments or suggestions in any format that helps explain your responses. Thanks for your help in teaching about recycling!

Overall--Format
What changes, if any, would you make to the format of any of the components of the curriculum? Please comment on graphics, layout, transitions, indexing, readability etc.

Oregon Schools' Formula for Success in Waste Reduction Handbook
Did you use the handbook to help your school organize or change its recycling program? YES NO
Rate each item according to the following scale:

No, It did/would not really help				It was/could be of some help				It was/could be extremely useful	
1	2	3	4	5	6	7	8	9	10

Was the information in the handbook:	
Adequate to guide the school in establishing/ revising its recycling program?	1 2 3 4 5 6 7 8 9 10
Necessary/helpful to your school's recycling activities?	1 2 3 4 5 6 7 8 9 10
Understandable for all members of your recycling team?	1 2 3 4 5 6 7 8 9 10
Which of the sections was the most helpful:	
Background information on Oregon's waste issues	1 2 3 4 5 6 7 8 9 10
"Simple Steps" to organizing a school recycling program	1 2 3 4 5 6 7 8 9 10
Background Information/Ideas for Waste Reduction	1 2 3 4 5 6 7 8 9 10
Ideas on Waste Reduction through Purchasing Practices	1 2 3 4 5 6 7 8 9 10
Ideas on ways to reduce waste	1 2 3 4 5 6 7 8 9 10
Background information, hints, tips, guidelines on recycling	1 2 3 4 5 6 7 8 9 10
Information on the recycling symbol	1 2 3 4 5 6 7 8 9 10
Guidelines for sorting recyclable materials	1 2 3 4 5 6 7 8 9 10
Ideas on getting staff and students to participate	1 2 3 4 5 6 7 8 9 10
Case studies of award-winning programs from other schools	1 2 3 4 5 6 7 8 9 10
Waste Stream Audit form	1 2 3 4 5 6 7 8 9 10
"Now Decide" planning form	1 2 3 4 5 6 7 8 9 10
"For Assistance Call" contact information	1 2 3 4 5 6 7 8 9 10

What additional/different information did you need?

Classroom Activity Packet(s)

List which Activity Packets you are evaluating: K-2 _____ 3-5 _____ 6-8_____ 9-12_____
Did you use the lessons in the classroom? Yes____ No____ Yes, with modifications _____
If you modified the lessons, please attach comments on what you did and how it worked.

Please rate the following elements of the activity packets using the rating scale provided
DK=Don't Know 1=Poor 2=Adequate 3=Average 4=Good 5=Exceptional

Are important recycling concepts included?	DK	1	2	3	4	5

If you rated this element 1-4, list any concepts you think should be added or deleted.

How easily can the curriculum be used in class?	DK	1	2	3	4	5
Overall rating	DK	1	2	3	4	5
Time needed for each lesson	DK	1	2	3	4	5
Access to necessary material(s)	DK	1	2	3	4	5
Explanation/directions for teaching	DK	1	2	3	4	5
Relationship between and among lessons	DK	1	2	3	4	5
Adequacy of materials/resources	DK	1	2	3	4	5
Explanation/usefulness of extensions	DK	1	2	3	4	5
Organization/structure of information	DK	1	2	3	4	5
Use of Handouts/Transparency Masters/Worksheets	DK	1	2	3	4	5
Audiovisual resource recommendations	DK	1	2	3	4	5
Appropriateness of lessons to grade level	DK	1	2	3	4	5
Adequacy/appropriateness of objectives	DK	1	2	3	4	5
Appropriate activities to evaluate learning	DK	1	2	3	4	5
Accuracy of information contained in each lesson?	DK	1	2	3	4	5

Teacher Resource Guide

Please evaluate each section of the Teacher Resource Guide using the rating scale:

The Big Picture	DK	1	2	3	4	5
The Facts	DK	1	2	3	4	5
History/overview of the waste problem	DK	1	2	3	4	5
Oregon hierarchy information	DK	1	2	3	4	5
Special concerns	DK	1	2	3	4	5
The Methods	DK	1	2	3	4	5

Please make comments on a separate sheet about the usefulness of each section in **The Methods**: Why Teach About Garbage?, Garbage Audit, School Recycling Programs, Taking Advantage of Technology, Simulations and Games, etc. Was each section helpful, necessary, understandable, etc.? Are there additional topics you would like to see addressed?

The Ideas	DK	1	2	3	4	5
Recycling Awareness Week Information	DK	1	2	3	4	5
Oldies but Goodies	DK	1	2	3	4	5
Classroom Resource Center	DK	1	2	3	4	5
Plays and Songs	DK	1	2	3	4	5
The Resources	DK	1	2	3	4	5
FYI: Trash Facts & Figures	DK	1	2	3	4	5
Glossary	DK	1	2	3	4	5
Local Resources information	DK	1	2	3	4	5
Bibliography	DK	1	2	3	4	5

Comments: (Please be sure to add additional comments as necessary to explain your answers)

Rethinking Recycling Curriculum Order Form

Please send me the following Rethinking Recycling curriculum components:

_____copies Oregon Schools' Formula for Success in Waste Reduction Handbook
(Out-of-state orders $5.00)

_____copies Teacher Resource Guide (Out-of-state orders $8.00)

Classroom Activity Packets (Out-of-State orders $5.00 each)
12 lessons, overhead transparency/worksheet/handout masters, pocket folder
_____copies *K - 2 Classroom Activities* _____copies *3 - 5 Classroom Activities*
_____copies *6 - 8 Classroom Activities* _____copies *9 - 12 Classroom Activities*

Audio-Visual Materials: (Out-of-state orders $6.00 each)

Note: The videos and clip art listed are available on loan for in-state users through your county's solid-waste office and/or your Educational Service District (ESD). Call DEQ Public Affairs (503) 229-6709 (1-800-452-4011 in Oregon outside Portland or (503) 229-6993 TDD) for current information on availability in your local area.

_____copies Time's A Wasting: Garbage and Recycling in Oregon (Grades 4-12)
_____copies The Wonderful World of Recycle (Grades K-3)
Recycle Lifecycle: (K-12)
(Note: The Recycle Lifecycle videos will not be released until after the spring of 1994.)
_____copies School Paper _____copies Steel Cans _____copies Glass Containers

Informational Materials (Out-of-state orders $3.00)
_____copies Oregon Recycles Clip Art

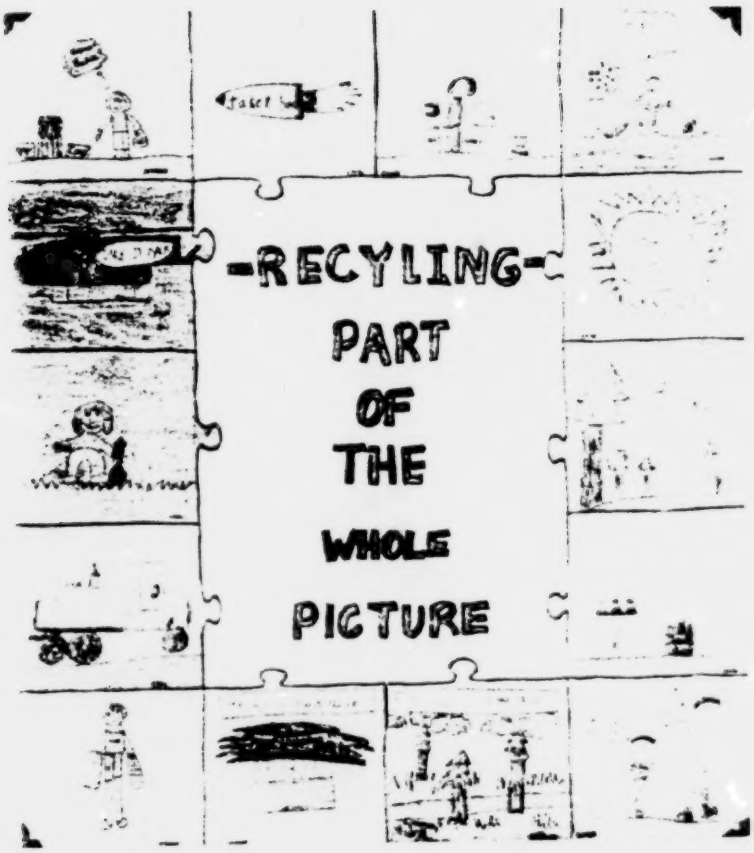
Name _____

School/ Business Name _____ Phone_____
Position Title/ Grade Level _____
Address _____
City/State/Zip _____

In-state Orders: In-state orders are free.
If you are located within the three Portland metropolitan area counties, return this form to
METRO Public Affairs
600 NE Grand
Portland, OR 97232 or call (503) 797-1521
If you are located in Oregon but outside the METRO counties, return this form to
DEQ Public Affairs
811 SW 6th Ave.
Portland, Or 97204-1390 or call (503) 229-6709 or 1-800-452-4011
For the hearing impaired, TDD orders can be taken at (503) 229-6993

Out-of-state Orders: Return this form to DEQ (address above) with a check payable to DEQ for the total amount of your order (see listed prices). Orders must be prepaid to be mailed.

the facts



Section Two: The Facts

Making the Teacher a "Master Recycler", or Content Expertise at your Fingertips: Fact Sheets, Reprints of Articles, etc.

- The Problem with Waste
- The History of Waste Reduction/Disposal Efforts
- The Oregon Hierarchy of Solutions
  - Reduce
  - Reuse
  - Recycle
  - Compost
  - Recover Energy
  - Dispose of Remaining Waste
- Special Concerns
  - Source Reduction
  - Household Hazardous Waste
  - Litter and Marine Debris
  - Plastics
  - Green Advertising Claims
  - Responsible Stewardship

The Problem with Waste

As noted by waste historians everywhere, "there is no away". Americans generate more waste than any other nation in the world. More than 2.5 million tons of municipal solid waste (garbage) is generated each year in Oregon alone. Over 500,000 tons of this municipal solid waste is recyclable paper, cardboard, glass, steel, and aluminum that is landfilled. The amount of waste generated in the United States has skyrocketed. An Environmental Protection Agency (EPA) 1992 study showed that the generation of municipal solid waste grew steadily between 1960 and 1990, from 88 million to over 195 million tons per year. Per capita generation increased from 2.7 pounds per person per day in 1960 to 4.3 pounds per person per day in 1990.

The History of Waste Reduction and Disposal Efforts

According to Dr. Joe E. Heimlich, of The Ohio State University in Columbus,

> Throughout our history, we have viewed waste as out-of-sight, out-of-mind. Let's look at a little bit of waste management history.
>
> In the earliest part of the Roman empire, waste was viewed as something dirty, something to keep out of sight of the senators and the privileged class. As Rome was growing, Roman law required that garbage be hauled one mile outside city limits after dark, thus keeping it out of view. Of course, as the city grew, it continued to grow right over the old pits where waste had been dumped. This caused disease in the "new" sections of the city, so the new city was always for the serving classes.
>
> This mentality has remained throughout the ages. In the late 1800s and early 1900s, a technology was developed called crematoria. A crematorium was a "trash burner" on a cart that was hauled through the streets. People -- and in the rich sections of cities, the servants -- would carry the waste to the curb and, as the crematory passed, throw the waste into the burner. This "magic" answer to waste management seemed to work. . . until the composition of waste changed.
>
> The increase in "disposable waste" in the United States changed the manner in which waste could be disposed. No longer was waste primarily food (which historically had been fed to farm animals), rags and fiber, but waste began to contain more glass and metals. In the late mid-century, aluminum became a large component of the waste stream. And the 1950s gave rise to what is now known as the "fast" society -- fast food, fast cars, fast pace. This fast society was founded upon the concept of disposal. Throw-away items became the norm, not the exception. And in the 1960s, plastic became a significant player in the marketplace.
>
> Today, our waste reflects our lifestyle. This is neither good nor bad, it simply is.
>
> (From Waste Wise, Dr. Joe Heimlich, Aseptic Packaging Council, 1991.)

Oregonians have a proud history of using the legislative process to protect the environment.

As early as the 1930's, the forerunner of the Department of Environmental Quality (DEQ) was established to clean up pollution in the Willamette River.

The Oregon Bottle Bill

The first state law of its kind, the Oregon Beverage Container Act--known as the Bottle Bill--was enacted in 1971. Both legislators and a concerned public saw it as an immediate solution to the increasing problems of beverage container litter on public roads and beaches. The Bill was designed to place primary responsibility for implementation on the public, and in this way, to give them an opportunity to become involved in preserving their state's resources and natural beauty. An opinion poll conducted four years after Bottle Bill implementation showed 90 percent of Oregon residents favored the law. Provisions of the law include:

- All beer and soft drink containers must have a minimum refund value clearly marked, paid by dealer to consumer. (The 1985 Oregon Legislature unsuccessfully tried to add wine cooler containers, non-existent when the Bottle Bill was enacted.)
- Except for certified containers (refilled by more than one manufacturer), minimum refund value of each container is five cents. Certified containers carry a two cent minimum refund.
- No beverage may be sold in a container with a detachable metal pull tab in the opening of the container.
- Plastic ring devices that hold six-pack cans together must depose within 120 days of disposal (1977 Amendment).
- Anyone may establish a container redemption center. Dealers and distributors must accept and refund deposits on empty beverage containers of the kind, size, and brand which they sell. They may refuse excessively dirty containers; they also may refuse more than 96 containers a day from one person if a notice is posted stating acceptance times for larger quantities.

The refund system for refillable bottles was established long before non-refillables were introduced in Oregon. Consumers accustomed to returning empty glass bottles to the store quickly accepted deposits on aluminum and plastic cans and bottles and on single-use glass bottles.

Deposits on refillable containers start with the brewer or bottler; on single-use containers, with the distributor. The deposit flows in reverse when the consumer returns an empty container to the store for the refund. At the store, the empties are sorted and counted, and then collected by the distributor. Refillable bottles are shipped back to the brewery or bottling plant for reuse. Aluminum, plastic and glass single-use containers return to the distributor's warehouse to be prepared for recycling.

The Oregon Bottle Bill has no provision for a handling fee to compensate the retailer for handling expenses incurred. The brewer, bottler, or distributor is permitted to keep unredeemed deposits. (Less than eight percent of the containers are not returned.) Income from selling returned containers for recycling generally goes to the distributor.

By the end of the first year of implementation, nearly four million fewer beverage containers were thrown away than in the previous year. One survey showed that 95 percent of all carbonated beverage containers were being returned at that time. Within two years of

implementation, roadside litter from beverage containers was reduced by 83 percent. By 1986, the beverage container portion of roadside litter was four percent, down from 40 percent prior to the Bottle Bill. In addition, researchers indicate that as a result of the Bottle Bill, Oregonians are more supportive of environmental causes than people in non-bottle bill states.

As Oregonians stopped throwing away beverage containers, they reduced other litter, too. By the second year of the Bill, total volume of Oregon's roadside litter had been cut nearly in half. Residential solid waste volume has decreased an estimated five percent as a result of the Oregon Bottle Bill. Through high return rates, the Bottle Bill provided a stable stream of recyclables. In 1981, an estimated 12,417 tons of beer bottles and 5,593 tons of aluminum beer cans were recycled. Cardboard cases and six-pack holders also are recycled as they accumulate.

With its high level of public participation, the Oregon Bottle Bill has been an unqualified success. It has reduced litter and demand on both landfills and energy for manufacturing. It has preserved Oregon's natural resources and scenic beauty. And it has increased public awareness of the need for waste reduction and additional recycling. In large part, the Bottle Bill has been the foundation for the state's comprehensive solid waste management program which followed.

1983 Recycling Opportunity Act

In 1983, Oregonians once again showed their understanding of the components of a healthy environment by supporting legislative passage of the Recycling Opportunity Act (ROA). The Act contained provisions which allowed people in both rural and urban areas of the state to voluntarily take part in recycling. After the passage of the ROA, drop-off depots were located at all public landfills and in other sites convenient to rural area residents. In cities with over 4,000 residents, curbside collection of source-separated glass, newspaper, cardboard, tin, aluminum and motor oil was offered. Certain areas also collected plastics, magazines, and yard debris at curbside.

By 1990, 106 cities had established curbside collection programs, although only 69 of those cities had populations of 4,000 or more. Curbside collection was available to close to 75 percent of all Oregonians.

1991 Recycling Act

The state's most recent recycling legislation was unanimously passed by the 1991 Oregon Legislature. It expands the 1983 Act by focusing on the entire recycling circle: collection, remanufacturing, and purchasing.

The Act set a goal of 50 percent recovery from the waste stream by the year 2000, and set interim goals for each county for the calendar year 1995. Stringent procurement requirements on material ranging from paper to tires have been assigned all public agencies. Minimum content standards have been set for glass, newsprint and directories, and rigid

plastic containers. A market development council composed of industry representatives appointed by the Governor is designed to further stimulate markets.

Through data reporting requirements and a waste composition study, the Act also will give the state its first quantifiable data on volumes of recyclables collected.

To reach their interim goals, cities over 4,000 population are required to select from eight service options. The options include weekly residential recyclables pick-up, same day as garbage; distribution of containers; expanded education and promotion; expanded drop-off depots; home composting and yard debris collection; incentive-based fees; commercial and institutional recycling; and multi-family recycling. Cities from 4-10,000 population must choose three; while large cities must choose four or five options.

DEQ's Solid Waste Reduction and Planning Section administers laws relating to solid waste reduction and recycling. (The Bottle Bill, however, is administered by the Oregon Liquor Control Commission.) The Section also reviews and approves recycling tax credits and manages the state's recycling grant program, which in its first two years of operation (1990-1991) awarded over $500,000 to rural communities. It also managed a household hazardous waste program which included funding, traveling collection events and planning for permanent facilities and resources. It offers technical assistance to local governments and other state agencies. The HHW program funding was eliminated by the 1993 legislature.

Currently the Section is developing an information management system to facilitate data-gathering and reporting.

A strong education and promotion component is proof of the state's conviction that an informed populace will take part willingly in recycling and waste reduction activities. The Section's implementation of Oregon Statues ranges from an annual statewide Recycling Awareness Week to distribution of a recycling curriculum for students in grades K-12.

The Future

DEQ Solid Waste staff look ahead through preparation of a statewide solid waste management plan. The planning process includes input from 13 local work groups from different areas of the state. By tracking, monitoring and guiding development of solutions to solid waste concerns, this group helps determine Oregon's quality of life for coming generations. In this way, it exemplifies its 1992 mission statement: "to be a leader in resource conservation in order to ensure a sustainable future."

The Oregon Hierarchy of Solutions

Provisions of the 1991 Oregon Recycling Act

As with many other agencies, governments and organizations, the 1991 Oregon Recycling Act utilizes a concept called "integrated waste management" to deal with the issues of waste in Oregon. Integrated waste management involves using as many alternative ways to deal with waste as are feasible, rather than relying on a single method of disposal. Therefore, this bill establishes a "hierarchy" for waste reduction efforts in the state.

 # 1 Reduce the amount of waste you generate.

This options asks citizens, businesses and agencies to carefully assess the waste that results from daily activities. Waste reduction requires intensive education efforts, both in school and at home. Individuals as well as businesses and government agencies can make a tremendous impact on the total amount of waste generated by looking carefully at habits and preferences. Some of the most common activities that contribute to waste reduction include precycling (making choices that will result in less waste BEFORE purchasing); source reduction (decreasing the amount of waste associated with a product at its manufacturing source); and buying recycled (purchasing products that are made from recycled materials). Specifically, it requires state agencies to purchase recycled paper products, retreaded tires and recycled oil; to only purchase recyclable copy and fax paper; and to require bidders to specify recycled content in products. These options help ensure that materials will not end up in the waste stream.

 # 2 Reuse anything you can.

This option requires a major change in the attitudes of consumers about needs, wants and product purchases. Our modern consumer economy includes

- consumable products: items that are "used up", burned as energy or disposed of as waste (e.g. gasoline and food)
- durable products: items designed to be used repeatedly, that can be repaired or maintained to extend the life of the product (e.g. clothing, furniture and tools)
- disposable products: items that are designed for single or short-term use either for reasons of hygiene or convenience (e.g. paper/plastic dishware, disposable diapers and personal hygiene products)

The market economy which sustains our American society spends millions of dollars on advertising and on "planned obsolescence" to generate a market for products. Planned obsolescence depends upon fashion or style changes to encourage consumers to replace what would otherwise be a durable product. Advertising often "sells" consumers on using disposable products for their convenience, or utilizes other desirable claims (youth, beauty, status, success, luxury, time savings, etc.) to encourage people to purchase items that may soon find their way into the waste stream.

Some specific actions consumers can take to reduce their contributions to the waste stream include

- Assess needs and wants. Learn to distinguish between items that we really need and items that advertising claims or other enticements might encourage us to want.

- Carefully review alternatives. Before you buy, consider reusing or altering an item you already have, purchasing items from garage sales or thrift shops, or swapping with neighbors, friends or family for items they have. Once you have determined a new item is necessary, consider rental or co-op purchasing, or other alternatives to purchasing new items that may not have long-term usefulness.
- Use selective purchasing practices. Identify criteria by which you will judge purchases, including the potential lifetime of the product, repairability, style, packaging, etc. Consider buying in bulk, avoiding disposables by buying re-usable alternatives, choosing products with the least packaging possible, selecting recyclable packaging and packaging made from recycled materials, and saying no to extra bags for items you purchase. To encourage some of these habits, the 1991 Recycling Act requires retail stores that offer plastic bags to also offer paper bags.

The following information from a DEQ news release issued February 26, 1993, helps clarify some of the choices consumers need to make.

> Oregonians make environmental choices daily. To drive or ride the bus? Paper or plastic? Most consumers are aware that mass transit is the most environmentally sound travel option. But the paper-plastic choice at the supermarket is more confusing. To aid consumers in their brown paper/plastic bag choice, the Oregon Department of Environmental Quality suggests that consumers think locally.
>
> "Here in Oregon brown paper bags are more readily recyclable in almost every community," according to Pat Vernon, DEQ's manager of solid waste reduction and planning. "With our timber economy, paper products constitute a larger recycling market share than plastic."
>
> This larger market share is illustrated by a 1992 study by the U. S. Environmental Protection Agency. It found that plastic bags and sacks constitute a smaller share (.6 percent) of the nation's solid waste stream and are recycled at a rate of 3.1 percent. Paper bags and sacks, while constituting 1.4 percent of the waste stream, are recycled at a rate of 8.2 percent.
>
> Since January 1, 1992, Oregon law has required retailers offering plastic bags for customer purchases to offer paper bags as an alternative and to inform consumers that a choice is available. "Some retailers are more diligent about this requirement than others," notes Vernon. "Our goal is to inform all Oregonians that they have a choice."
>
> Vernon also notes, "Another environmentally sound consumer choice is to use less of both materials!" Both paper and plastic can be reused many times. Bring bags back to the store rather than using new ones or bring a reusable canvas shopping bag. Consumers can further reduce paper and plastic waste by using the smallest bag that will do the job. For smaller, lighter purchases, bags are often not needed; hand carry when possible.

 # 3 Recycle anything for which you have a market.

The 1991 Recycling Act establishes goals for waste recovery that include items specific to the recycling process.

- Requires cities with greater than 4,000 population to provide recycling collection services for citizens.
  Cities of 4,000 population or more shall provide:
  - Weekly residential curbside collection of source-separated materials on same day as garbage service
  - Expanded education and promotion programs
  - Recycling containers to residential customers

  OR they may select other options from the following:
  - Multi-family housing recycling
  - Residential yard debris collection and composting
  - Commercial/institutional recycling
  - Expanded recycling depots
  - Reduced waste rates for smaller containers
- Requires state agencies to recycle or reuse materials, goods and supplies when they are discarded.
- Requires recycled products demonstration projects by various state agencies.
- Establishes recycling market development efforts
- Requires minimum recycled content for specific materials:
  - Newsprint, 7.5 %
  - Rigid Plastic Containers, 25 %
  - Directories, 25 %
  - Glass, 35 % by 1995 (increases to 50% by 2000)

Recycling is not just a process of putting materials into a recycling collection system. Recycling is a closed-loop process that takes products back for re-manufacture, and must end with consumers purchasing materials made from this recycled material. The following information from DEQ fact sheets will help explain the recycling process after materials are collected at the curb, roadside, or depot.

The Recycling Process After Collection

At the time The Oregon Recycling Opportunity Act was passed, it set up a statewide system for managing solid waste that was called the most comprehensive in the nation. Residents of most cities over 4,000 population may place glass, tin, cardboard, newspaper, aluminum and motor oil at curbside for pickup. They and residents of the more rural areas of the state also may take recyclable materials to public landfills, transfer stations, and conveniently located drop-off centers.

Whether Oregonians place recyclables at curbside or drop them off at a local collection depot, just where does the material go next? The specific route depends on the item in question, but there are some common threads. They have to do with words like collector and hauler, resale, transportation and energy. They have to do with conserving, and with saving natural resources and fossil fuels and materials. They have to do with insuring that we preserve our state as we know it for generations to come.

But the process of collecting and re-manufacturing recyclable materials, outlined here, is only part of recycling. Buying and using a recycled product completes the circle. Look for the recycled label on the products you buy, and ask your store manager to stock recycled products and products made of recycled materials.

Newspaper

What's black and white and read over and over? Recycled newspaper.

You begin the recycling process when you set it apart from your household garbage and place it at curbside or in a bin at a drop-off depot. Or when you participate in a paper drive. Whichever method you select, the paper is picked up by recycling collector. At curbside, this might be your garbage hauler or a recycling service working with your garbage hauler. The collector combines your newspaper with paper from other households and sells them to a paper dealer who, because of the volume of material purchased, often operates out of a storage warehouse. The dealer then sells quantities of paper to a user. This is where the actual recycling--manufacturing one product into a new product--takes place.

Old newspaper is an essential material in the paper remanufacturing process. Because paper mills must be concerned about both quality (cleanliness, type of paper) and quantity of the supply, they usually issue purchasing contracts to dealers rather than buying small amounts of paper from the public. Some contracts might be for a month, while others are ongoing.

At the paper mill, de-inking facilities separate ink from the newspaper fibers through a chemical washing process. A slusher turns the old paper into pulp, and detergent dissolves and carries the ink away. Next, screens remove contaminants like bits of tape or dirt. The remaining pulp is bleached and mixed with additional pulp from wood chips to strengthen it. The watery mixture is poured onto a wire, a continuously moving belt screen which allows excess moisture to drain through. By the time the mixtures gets to the end of the belt, it's solid enough to be lifted off and fed through steam-heated rollers which further dry and flatten it into a continuous sheet of paper. This paper machine produces finished newsprint at the rate of 3,000 feet per minute.

Finally the newsprint is trimmed, rolled, and sent to printing plants to be imprinted with tomorrow's news. The Smurfit mills in Oregon City and Newberg are the major users of old newspaper in Oregon. Together they process close to 900 tons every day. This is equivalent to a stack of newspaper nine and one-half miles high, and nearly 2.5 times the amount of newsprint printed and sold in this state each day. Even though Oregonians recycle nearly twice as much newspaper (close to 70 percent) as do residents of any other state, the mills must depend on old newspaper shipped to them from other states as well as that from Oregon to maintain their inventory.

Not all old newspaper in Oregon is recycled back into newspaper. Western Pulp, located in Albany, uses old newsprint for manufacturing molded flower pots and other specialty items. Energy Guard in Clackamas produces blown-in cellulose insulation from old newsprint. Paper brokers also may sell old newspaper to overseas markets. In that case, the paper sometimes is reused (rather than remanufactured) as wrapping paper.

Cardboard

What is cardboard? If you answered a brown box, you're only partly correct. There are two types of cardboard. The first is called boxboard. This a solid sheet used for products like shoe boxes and tablet backings. The gray color indicates that the boxboard has been made of recycled materials. The color comes from combining different types of paper, some of which may have had the ink left on them. The second type is called corrugated cardboard, or just corrugated. It is commonly used to make what most people call "cardboard boxes." Corrugated is a paper sandwich of linerboard (the two outer layers) and the medium (the ribbed inner layer).

While some corrugated cardboard is recycled at curbside, the bulk of it comes from commercial rather than residential sources. If you've every checked the service area of your local supermarket or furniture store, you'll see the volume of corrugated packing material used by commercial outlets. That's because corrugated containers are sturdy, strong, and can be custom-made to a particular order.

Like homeowners, stores usually have their garbage hauler or recycling service collect their cardboard. The hauler next sells it to a dealer, who collects and guarantees quantities of a material to end users. In most cases, the end user is a paper mill.

At the mill, the corrugated is pulped and blended with additional pulp from wood chips. Broken, thus shorter and weaker, old fibers are blended with the new pulp to make the medium. Recycled paper fibers and new pulp are blended to make linerboard. Then the medium and the linerboard are shipped to a boxboard plant, where the manufacturing process is finished. The medium is corrugated by specially-geared machines, the linerboards are glued on, and the resulting flat pieces, called mats, are trimmed to size and creased along a pattern of folds. The mats are shipped flat to customers who set them up into boxes. Then the boxes are used to package products for shipping.

Oregon has four major cardboard recycling plants: Weyerhauser in North Bend makes medium, but their Springfield plant makes linerboard; Willamette Industries in Albany makes only linerboard. Georgia-Pacific in Toledo makes both medium and linerboard. The latter two plants also make recycled paper for brown, or Kraft, paper bags.

Glass

The most common and easily recycled type of glass available in Oregon is container glass: bottles and jars. Other glass products, such as Pyrex bowls and window glass, each are made from different chemical formulas. While technically recyclable, the different types can't be mixed in recycling. And because the on-route collector has a limited amount of space on the collection vehicle, it isn't feasible to pick up every different type of glass at the curb.

Glass bottles and jars which are empty and rinsed clean should be placed at curbside--carefully. Most recycling collectors ask residents not to break the containers for safety purposes, although an on-route collector may break them to make more room on the collection vehicle. Also, some recycling drop-off centers ask you to leave the glass intact, while others allow it to be broken. And while most Oregon collectors ask that you sort the

glass into green, brown and clear colors, some collectors allow mixing. After the recycling collector accumulates a quantity of a particular color, he may sell it either to a dealer, who will buy small amounts from several collectors, or directly to a glass plant.

At the plant, a mechanical processing system breaks the glass into small pieces called cullet. Magnets, screens and vacuum systems separate out metals, labels, bits of plastic, metal rings and caps. The cullet then is blended in measured amounts with silica sand, soda ash, and limestone, and placed in a furnace which melts it into molten glass. Oregon's recyclable glass containers go to Owens-Brockway, a unit of Owens-Illinois, Inc. in Portland. A small amount of container glass also goes to Bullseye Glass, Portland, for manufacturing stained glass.

Thanks to the Oregon Bottle Bill, some of our state's glass containers are reused again and again before they are remanufactured at Owens-Brockway. Reusing an item is more economical and saves more energy than does remanufacturing it. The Oregon Bottle Bill was enacted in 1971, making Oregon first in the nation with a statewide beverage container deposit system. The consumer pays a deposit when the container is purchased. When it is empty, the consumer may return it to any store which carries that product, exchanging the container for a refund. After the consumer returns bottles to the store, they are sorted into different brands.

A distributor, or wholesaler, collects the empties for the brands he sells. When the Bottle Bill was passed, distributors washed, sterilized and refilled the bottles collected. Today, with shape and style differences among brands, the majority of the bottles collected under the Bottle Bill go directly to Owens-Brockway for recycling.

Tin cans

Tin is an excellent example of quality vs. quantity. Even though it's used in minute amounts, tin is essential in producing a variety of everyday items, including "tin" cans. While the cans originally were called "tinned" cans, the term was shortened to "tin" over the years. The term "tinned" is more accurate, because the cans aren't made of tin. At least, not much. One ton of tin cans contains about 1,995 pounds of steel and only five pounds of tin. Yet that thin coating of tin on a steel can is essential: it helps solder the sideseam, keeps the can from rusting, and protects its contents.

To prepare tin cans for collection, remove tops and bottoms and flatten the cans. (Flatten seamless cans like cat food, tuna fish cans, or some soup cans, as best as you are able). When cans are flattened, the curbside collector is able to load more into the truck, thus saving the time it would take to drive the truck to the storage facility, unload it and resume the collection. And since costs of shipping the cans to detinning plants also are determined by truckload, loads of compacted, flattened cans are more economical to ship.

After the cans are collected on-route, the volume of cans collected and type of transportation arrangements available will determine whether the load will go through a dealer or directly to a detinning plant. At the plant, another reason for cutting lids off becomes evident. The chemical detinning solution flows into and drains out of the cans more easily, which results in better recovery of the tin during the reclaiming process. That process is made up of a

series of chemical and electrical steps which separate, purify, and recover the steel and tin. In the batch process of detinning, the cans first are loaded into large (10' x 14') perforated steel drums and dipped into a caustic chemical solution which dissolves the tin from the steel. The now-detinned steel cans are drained, rinsed, and baled into 14"x14"x30" 400-lb. squares. Then they are sold to steel mills to be made into new products.

Meanwhile, the liquid with the tin, a salt solution called sodium stannate, is filtered to remove scraps of paper and garbage. Then it's chemically treated to eliminate other metals. Next, the solution is transferred to an electrolysis bath which works like a battery in reverse. When electricity is applied, tin forms on one of the plates in the solution. After the plate is covered, the tin is melted off and cast into ingots. The ingots are at least 99.98 percent pure tin and are used in the chemical and pharmaceutical industries. Pure tin also is alloyed with other metals to make solder, babbitt, pewter, and bronze products. And it coats steel for "tin" cans. Cans collected in Oregon are shipped to the nearest detinning plant, MRI Corporation in Seattle.

Aluminum

Aluminum takes many forms. It's used for consumer products ranging from beverage cans to TV dinner trays to door frames. It's rolled and made into foil (often inaccurately called "tinfoil"). It's all aluminum, and it's all recyclable.

In Oregon, aluminum beer and soft drink cans are included in the Bottle Bill, and may be exchanged for deposit at the store. After that, the cans follow the same route to re-manufacturing as does both the household aluminum scrap picked up at curbside and the aluminum swing set or patio furniture which is taken to a recycling depot.

The scrap metal may go through several hands, including a recycler or scrap metal dealer. Its route, and whether it is sold domestically or abroad, depends on such business conditions as cost of transportation, supply, and demand.

But eventually all scrap metal reaches a producer, or smelter, where it may be shredded or ground into small chips before being melted and cast into ingots. The ingots are sent on to manufacturing plants where they are rolled into sheets of aluminum and used to manufacture end products ranging from cans to castings to car bodies. The major market for shredded aluminum are exports (comprising a variety of end-users) and domestic smelters.

Nearly every large city has several firms which collect and sell scrap metal to Schnitzer Steel Products, Acme Trading & Supply, and Calbag Metals, major scrap metal dealers located in Portland. They in turn, ship aluminum to Alcoa and Reynolds, the major domestic smelters outside the state.

Motor Oil

Putting your used motor oil at curbside or leaving it at a recycling drop-off depot makes sense, environmentally and economically. Recycling motor oil keeps it out of storm sewers, where it can pollute our waterways. Used oil costs less than virgin oil. And it's readily available, even in times of international political crises. Over the years, re-refined oil has

been used for everything from lubricating oil for vehicles, chainsaws, or machinery to heating fuel for buildings, ships, and cement and asphalt kilns.

Collectors ask that you place the motor oil at curbside or the depot in a clean, non-breakable bottle with a lid. That way the bottle can be transported safely and easily. After it's picked up, the collector usually takes the oil back to the shop and pours it into one of a number of tanks or drums for storage. When the drums are full of oil, an independent hauler pumps them out into a special collection truck and delivers the load to an oil processor.

The processor first tests the oil, using standards established by the federal Environmental Protection Agency (EPA) to detect contaminates such as hazardous waste and lead. Then any water that may be mixed with the oil is eliminated, either through a settling process or by being heated and boiled off. After it is tested once again, the used oil is blended with other grades of oil. Used oil that meets EPA testing standards for flashpoint and heavy metals is called specification fuel. This type of oil is considered environmentally safe to burn in any boiler, because of the high ash-forming components of used oil, boilers designed for easy ash removal are recommended.

One role for used oil today is to help lighten bunker fuel, the heavy residue left from virgin oil refining. Bunker fuel often is used in ships' boilers, even though it becomes thick enough to be walked on when cold. Without the lighter-weight used motor oil, bunker fuel would hardly flow through the pipes when temperatures drop. Used oil also is burned in asphalt plants to heat the tar used in the asphalt. And it is used in cement and lime kilns to provide heat for driving the chemical reactions necessary to produce cement and lime.

As recently as two decades ago, most used oil was re-fined into new lubricating oil for cars and trucks. However, the high performance lubricating oils available today have extensive additive packages that make them difficult to be re-fined and reconstituted. Presently, virtually none of the oil recycled in Oregon is sold as automotive oil, and only five percent of the oil is re-refined into oil for lubricating chain saws and machinery.

Twenty independent oil collectors pick up used oil from Oregon automobile service stations, industries, and recyclers. There are five major processors: Harbor Oil and Sunwest Energy are located in Portland; Industrial Oils is in Klamath Falls; and Inman Oil is in Vancouver, Washington. A recently funded project to encourage used oil recycling by providing information in retail stores to make the process easier for home auto-mechanics.

 # 4 Compost organic materials, particularly yard debris.

Food waste and yard debris are the 2nd and 3rd most common items found in our trash by weight. In fact, the two of these together comprise a bigger percentage of the waste stream than any other item. As a result, it is important that we draw on nature's own recycling method--composting--to help reduce the amount of waste that goes to our landfills.

Composting can be done at home, in the school building using worm bins or small-scale compost heaps, or on a large scale through major municipal waste composting projects. Through the natural process of decomposition, organic wastes are turned into a rich soil additive called compost or humus. This material is dark, crumbly, and soil-like, and can be

used as mulch, top dressing, or soil amendment. The important conditions to remember in successful composting include

- Adequate surface area--the more room the microbes have to feed on, the faster the material will break down
- Volume--an adequate size pile (at least 3' by 3') will trap the heat generated by microbe activity, but piles wider or taller than 5 feet don't allow enough air to reach the microbes
- Moisture and aeration--both are necessary to the biological processes that allow decomposition to take place
- Time and temperature--the hotter the pile, the faster the compost will break down.
- Materials--anything that was once alive will naturally decompose. However, some organic wastes should not be composted at home or school.
    - **Do** compost grass clippings, leaves, flowers, old plants, old potting soil, twigs, annual weeds, vegetable scraps, coffee filters and tea bags.
    - **Do not** compost diseased plants, weeds with seeds, invasive weeds like quack grass and morning glory, pet feces, dead animals, bread and grains, meat or fish parts, cheese, butter, milk, grease, cooking oil or oily foods.

The Biology

All organic materials contain carbon and nitrogen in varying ratios (C:N). Carbon in brown leaves and woody wastes provides energy, while nitrogen in green grass and vegetable scraps provides protein for cell development. A C:N ratio of 30:1 is considered ideal for composting. This balance can be achieved by mixing roughly two parts grass clippings (C:N=20:1) with one part brown leaves (C:N=60:1). Making layers of green and brown materials can be useful in arriving at these proportions, but a complete mixing of ingredients is preferable for good composting. Higher rations of C:N will result in slower composting.

Bacteria start the process of decaying organic matter. They break down the plant tissue, and are the most numerous and effective composters. Fungi and protozoans, and then centipedes, millipedes, beetles and worms help complete the breakdown process.

The Methods

Compost systems range from the simple to the complex.

- Vermiculture utilizes red worms to make high-quality compost from vegetable and fruit scraps. Easy, but startup materials can be expensive--one of the most interesting to classroom teachers. See **The Resources** section for a list of sources for vermiculture materials.
- Direct Land Application--these methods include grasscycling (leaving the grass clippings on the lawn to mulch the grass), mulching (putting grass clippings, leaves, straw, sawdust, etc. around trees, shrubs and other perennials), and soil incorporation (burying organic materials directly in garden beds, etc.)
- Compost Holding Systems--including open-air bins made of wire mesh, fencing, wood or wire and closed-air composting, where the bins have solid sides and tight fitting lids to conserve moisture and hold in odors.
- Compost Turning Systems, designed to make hot, fast compost piles--these work best

with lots of material to compost, but require the most work because materials need to be turned every 4 to 7 days. Turning systems include a series of bins, or a tumbler or barrel system that allows turning by rotating the barrel.

Holding systems provide less heat, and are therefore slower, but also require no fuss. They may produce an inconsistent product. Turning systems are hot and fast, but are labor intensive. They are best for large volumes, and kill pathogens and weed seeds more effectively.

In the Portland Metropolitan area, Metro operates four compost demonstration centers that feature active residential-scale compost systems, interpretive signage and free composting workshops. Metro also distributes public education materials about composting. For more information, call Metro's Recycling Information Center (503 234-3000). Corvallis Disposal operates a municipal compost system. Information on field trips to these sites is included in **The Resources** section.

 # 5 Recover energy from the disposal process whenever possible.

There are two basic energy recovery methods in the waste disposal system. The first is energy recovered during the incineration of garbage in a facility like the municipal waste to energy recover facility operated by Ogden Martin Systems near Brooks (Marion County), Oregon. The Ogden Martin plant operates 24 hours per day and 365 days per year except for periods of scheduled maintenance. About 550 tons of municipal refuse is burned per day on the average, in two identical incinerator/boiler systems. To provide for efficient combustion of gases, the two furnaces must be operated at an average temperature of at least 1800 degrees when solid waste is present in the incineration chamber. The boilers produce steam which is used to generate electricity. The generating capacity of the plant is about 13 megawatts. Portland General Electric purchases the surplus electrical power. In addition to waste from Marion County and the West Salem area of Polk County, the facility accepts additional waste including medical waste from the Portland metropolitan area.

Energy recovery from the incineration of solid waste is an acceptable method of disposal as long as air, water and land resources are protected. To ensure this protection, the incineration facility must abide by air quality, water quality and solid waste regulations stipulated by the Department of Environmental Quality. Air quality permits control the sulfur dioxide and nitrogen oxide air emissions. Emissions from the boilers are controlled by a lime scrubber and baghouse. A scrubber is a piece of pollution control equipment that uses a lime slurry solution to actually "scrub" the exhaust coming from the facility's stack to remove pollutants. The scrubbers treat acid gases, primarily hydrochloric acid and sulfur dioxide. The particulate matter is removed in the baghouses, which work like a big vacuum cleaner to collect air particulates. The incinerator operator must show that toxins or potential disease-causing agents are effectively destroyed in the incineration process, a requirement because the facility incinerates medical wastes.

Water quality permits require that the facility cannot discharge water that comes into contact with refuse or ash. It does, however, discharge cooling water from the boiler systems, wastewater from the boilers, and backwash water from on-site demineralizers. The facility must neutralize the pH of the wastewater, and flow and temperature are monitored to protect

water quality in the Willamette River. Solid waste permits cover the types of waste that can be accepted, the transportation requirements for infectious waste, ash testing for the waste ash produced by the facility, and controls over all vehicles used to transfer both the waste and the ash connected with the facility.

Methane Gas Recovery

The second method for recovering energy from waste is the collection of methane gas (a by-product of waste decomposing in the absence of oxygen), which is then burned to produce energy. There is a methane gas recovery facility operated by the Emerald People's Utility District at the Short Mountain Landfill outside of Eugene.

#6 Landfill any remaining waste.

After all the other methods have been utilized to help reduce the amount of waste looking for a final resting place, landfilling seems to be the final solution. Unlike open dumps of the past where disease, pests and odor were prevalent, today's modern landfills are carefully constructed and managed to protect the air, land and water resources near them. Even so, many citizens are hesitant to allow landfills near residential or commercial areas. This has resulted in the "Not In My Backyard" or NIMBY syndrome. Many citizens who understand the need for a site to dispose of waste are still not comfortable putting that site adjacent to their own property. Voters repeatedly reject proposed sites, until many metropolitan areas (including Portland) now must transport their garbage long distances to sites that are more acceptable.

The U. S. Environmental Protection Agency has recently adopted new standards for the siting, operation and closing of landfills. These standards

- provide comprehensive, protective standards for managing the nation's solid waste burden
- specify location restrictions (cannot be close to airports, ecologically valuable wetlands or areas subject to natural disasters)
- outline facility design and operation provisions (keep out regulated hazardous waste, apply a daily cover, control disease vector populations, monitor methane gas, restrict public access, control storm water run-off, protect surface water from pollutants, keep appropriate records)
- specify ground-water monitoring requirements (requires monitoring wells, cleanup if needed)
- outline corrective action measures
- establish closure conditions (including financial responsibility and final cover provisions, with requirements to monitor for ground water, methane gas and leachate management for 30 years after closure)
- exempt certain small landfills (those that dispose of less than 20 tons of municipal solid waste per day)

In addition, the Oregon Department of Environmental Quality monitors

- leachate production
- ground and surface water protection
- access roads

- site screening
- cover material
- fire prevention
- litter control
- vector and rodent control
- endangered species protection
- recycling requirements at the landfill site

Although landfilling in the past was the inexpensive solution to waste problems, the equipment and materials required to conform to these new regulations is very expensive. Every landfill must install impermeable liners below the burial areas to collect leachate for treatment, vent or utilize methane gas, and monitor potential surface and ground water contamination, all of which are expensive activities. Landfill tipping fees rose from $18 in 1988 to $68 in 1991, and continue to rise.

In addition to the costs of meeting regulatory requirements, the NIMBY syndrome has made the cost of collecting and transporting garbage increase considerably. In some areas (including Portland), garbage haulers take the waste to a transfer station, where material recovery systems may further separate recyclable materials. These facilities then compact the garbage into transfer trailers to take the waste to the disposal facility. These transfer facilities eliminate the need for individual haulers to transport waste long distances, and the compacting process allows more waste to be transported in a single trip.

Landfill Siting Issues

Every year, over 2,000,000 tons of waste are buried in landfills in Oregon. That is increasing by 50,000 tons a year. Over 500,000 tons of recyclable paper, cardboard, glass, aluminum and other metals are wasted every year.

Valuable natural resources and energy are literally being buried alive: each ton of nonrecycled waste consumes around 50 cubic feet of landfill volume. Also, the energy savings realized by recycling is lost. For every ton of discarded recyclable paper, seventeen trees are cut down on a national average. Our landfills, by their very nature, deplete another shrinking resource--our land.

Sanitary landfills are the primary means of disposal in Oregon. They are positive alternatives to the un-managed dumps and are designed to protect the environment, public health and safety. Garbage is compacted and covered frequently with soil or another approved material to control burning and odor, pests and blowing litter. They are engineered and monitored to control leachate, the "garbage soup" which may leak out the bottom, as well as methane gas.

During the 1986-97 search for a new landfill site for the Portland Metropolitan area, the Department of Environmental Quality used the following criteria to objectively identify and evaluate potential sites. The process took nearly 24 months, and involved land-use planners engineers, geologists, hydrologists, economists, archaeologists, environmental planners,

transportation planners, and botanists, as well as specialists int he noise, air quality, soil, and visual resource fields.

Three categories were used sequentially: PASS/FAIL, SITE EVALUATION, and FINAL DECISION. Each was divided into five subcategories: political boundaries (identifying the tri-county area); regulatory (ensuring compliance with existing laws and regulations); environmental (identifying natural or cultural factors most important for environmental protection at or near the site); technical (addressing site characteristics relating to site design and operation); and economic (relating to the cost of site development as a landfill). As the sequences were applied, a numerical ranking system screened out more land and refined potential site boundaries.

PASS/FAIL

This was used at the beginning of the selection process to eliminate obviously inappropriate areas. The criteria included:

- political (limited the site search to Clackamas, Multnomah, and Washington counties, with consideration given to select sites in Columbia, Marion, and Yamhill counties)
- regulatory: groundwater (eliminated areas located over vital groundwater supplies classified by the US Environmental Protection Agency as sole source aquifers as of January 1986)
- environmental: surface and groundwater (ensured that the active landfill would not be located over a geological fault active in the past 10,000 years)
- environmental: natural habitat (eliminated areas identified by the US Fish and Wildlife Service as critical habitat for threatened or endangered plant or animal species)
- environmental: land use (eliminated areas with clearly incompatible uses such as Bull Run watershed, national parks, and paved highways)
- environmental: social and cultural (required that historic and/or archeological sites listed on the National or State Register must be at least 1,000 feet from the active landfill)
- technical: (stipulated that the active landfill must have slopes of less than 25 percent, that potential site areas must be at least 300 acres and have a total capacity of at least 15 years

SITE EVALUATION

These criteria identified potential sites most suitable for landfill development. Additional information on initial sites was obtained from public input, pertinent literature, file data, aerial photographs, and topographic maps. Using this information along with field investigations, the sites were studied again and three potential landfill locations were identified.

FINAL DECISION

These criteria compared the potential three sites. Detailed field investigations were conducted and added to information obtained from numerous public meetings to again

evaluate the sites. Another important consideration DEQ took into account at this point was the impact on the community where the new landfill would be located, and a plan was prepared which was designed to lessen the potential problems that could result from landfill development and operation. This Neighborhood Protection Plan included methods of reducing potential problems from noise, pollution, increased traffic, odor, etc., as well as measures designed to protect the natural environment.

Even with all the considerations of this process, an acceptable site was not identified within the Portland metropolitan area. As a result, Portland area garbage is trucked outside of the region to Columbia Ridge Landfill, which is 140 miles from Portland. In 1992, about 60 trucks filled with garbage made the three hour trek from Portland to Columbia Ridge each day. Garbage is collected from homes on a weekly, biweekly or monthly schedule by garbage haulers, who take the garbage to a transfer station. The garbage is tipped out of the truck into a compactor and baled. A giant bale, just a bit smaller than the truck's trailer, slides into the truck, and is hauled up the Columbia Gorge.

The landfill that takes the Portland area's garbage is located 30 miles south of Arlington, Oregon. The greatest advantage to this site is that this part of Oregon is desert, and therefore the landfill is less likely to contaminate groundwater than landfills in rainier areas of the state. The distance is the primary disadvantage. The landfill has 640 acres available, and planners estimate the landfill could serve Oregon for 50 to 100 years. It is a state-of-the-art landfill, and uses the most sophisticated system of liners, covers, and leachate and methane gas collection systems available to date.

Wastes are dumped at the landfill, spread in layers within its' liners, and compacted by a large bulldozer. At the end of each day, wastes are covered with a layer of soil to discourage odors, rodents and birds. Once a pit or cell is full, it is covered with topsoil and planted with ground cover to control erosion.

Reclaiming Recyclable Materials: Landfill Bans in Oregon

What is banned?
It is illegal to dispose of these materials in solid waste disposal sites in Oregon:

- discarded or abandoned vehicles
- large home or industrial appliances
- lead-acid batteries
- used oil
- tires

The intent of this ban is to divert reusable and/or recyclable materials from Oregon's landfills, especially materials that are toxic and can harm the environment if improperly disposed of.

If your trash is picked up at the curb: you should make separate arrangements for disposing of these materials so they aren't accidentally mixed with your garbage. Because they may have value as recyclables, check first with your garbage hauler, your local government solid waste department, or the Department of Environmental Quality.

If you haul your own trash: you can be held liable for disposing of any of these materials

at a solid waste disposal site. You may, however, leave them for recovery or storage for recycling at a recycling depot located at a landfill or transfer station or other collection site that accepts them.

There may be better options than disposal. In addition to the resources listed, contact DEQ for information about recycling these materials:

- **vehicles and home or industrial appliances** (also called "white goods," such as water heaters, refrigerators, kitchen stoves, dishwashers, washing machines and clothes dryers): scrap metal dealers, and most landfills and transfer stations, will accept these materials for their scrap value. A fee may be charged for accepting certain appliances since recyclers often need to process the appliances to remove non-recyclable or hazardous parts. Scrap metal recyclers and garbage haulers also often offer pick-up service for scrap metal. They too may charge a fee for this service.
- **used oil**: for information on recycling household amounts, contact your garbage hauler, transfer station, or landfill. Most curb- or road-side pickup programs and depots accept used oil in a clean, leak-proof container with a screw-on lid. (Many haulers recommend using a rinsed screw-cap milk jug to recycle oil). If the oil has been mixed with solvents, paint thinner, or other liquids, it must be disposed of at a household hazardous waste collection site or event. To recycle a large quantity of oil, such as that generated by a business, look in the Yellow Pages of your telephone book under "Oils: Waste" or call DEQ.
- **tires**: some transfer stations and drop-off depots will accept tires for recycling, and many volume tire dealers around the state will accept used tires for a minimal fee. (Off-road tires such as earth movers and other solid tires not allowed on highways, and tires chipped to DEQ standards, can still be landfilled.)
- **lead-acid batteries**: under a law passed by the 1989 Oregon Legislature, battery retailers and wholesalers are required to accept used batteries for recycling. You can trade in as many used lead-acid batteries as you purchase from the retailer. In addition, through 1993, retailers must accept at least one lead-acid battery from you for recycling, even if you do not purchase a new battery. Batteries also may be taken to a wholesaler, collection or recycling facility, or to a state- or EPA-permitted secondary lead smelter. Anyone who disposes of lead-acid batteries by any method other than recycling may incur a civil penalty.

Disposal site operators: the 1991 Recycling Act states that site operators can be held liable if they knowingly accept the materials listed here for disposal. They can, of course, continue to accept them for storage for recycling or recovery purposes. If self-haulers utilize the landfill, operators may need to update signs and flyers to advise the public to separate and place these items in the recycling area, rather than in the landfill.

Recycling Symbol: the Chasing Arrows

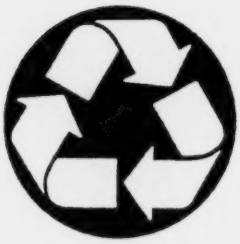
This is the universal symbol for recycling. The three arrow design represents a never-ending process: the three phases of recycling. If you look carefully, you can see the outline of a tree in the center of the symbol.

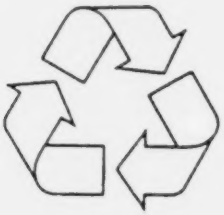
Collection of recyclable materials.

Re-Manufacturing into new products.

Purchase of recycled products by consumers.

Recycled: This symbol identifies products and packages that are made at least partially from material that has been used before, i.e. pre-consumer waste, waste from a manufacturing plant, and, more importantly, post-consumer waste, which is waste from your home, school or office.

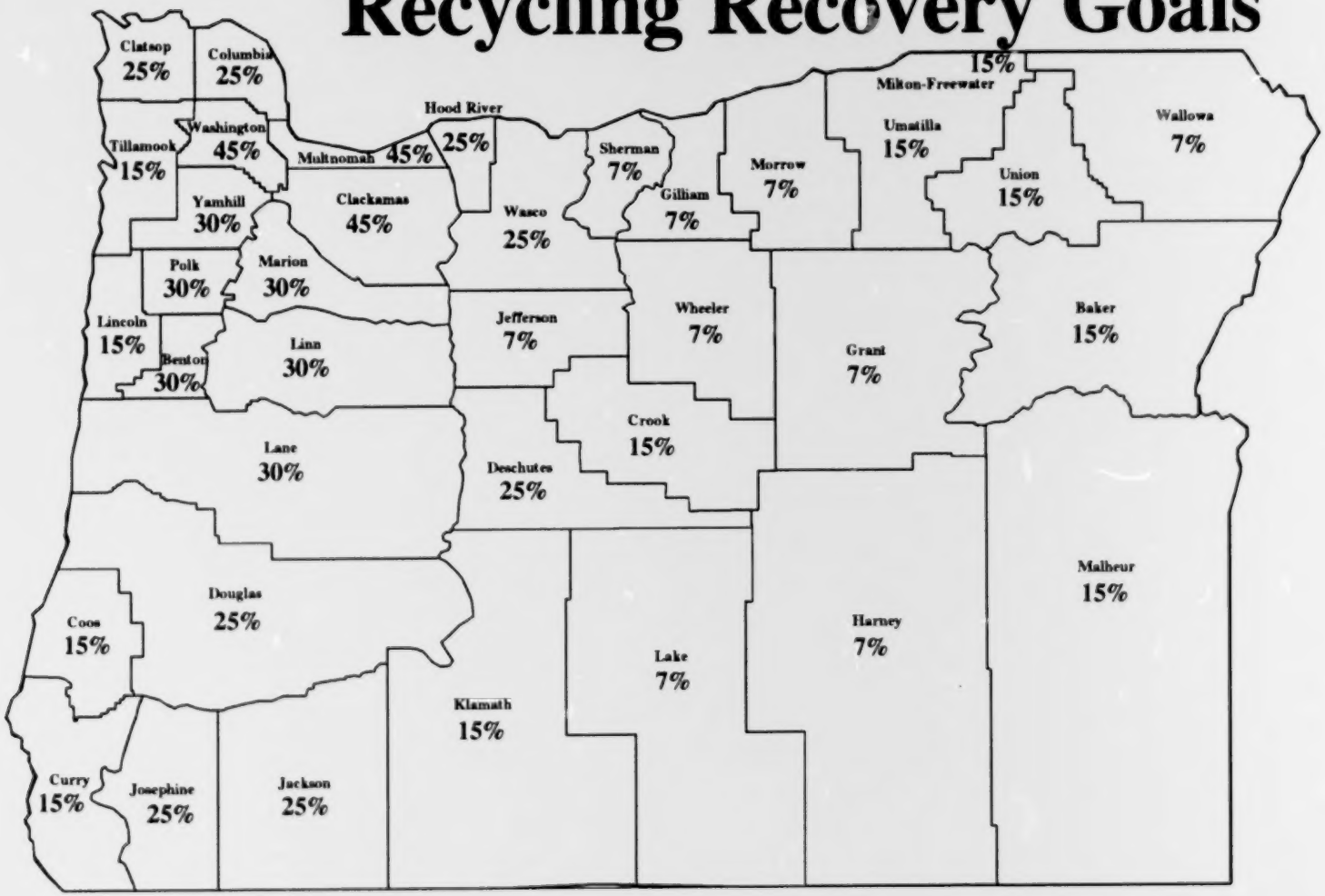




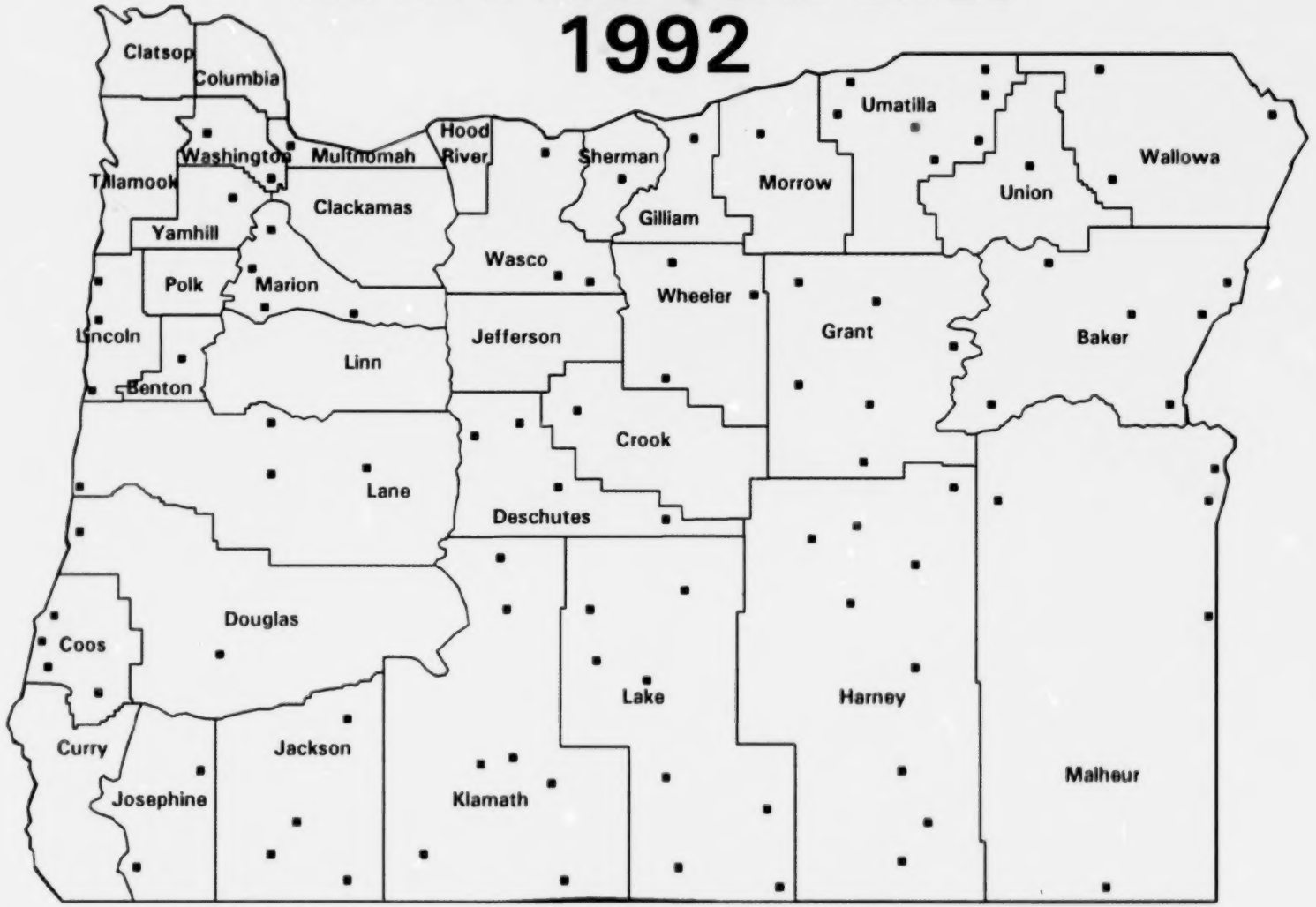
Recyclable: This symbol identifies products and packages that can be recycled. In other words, it can be sorted from your garbage, collected by your local recycler and made into a new product.

Keep in mind that a product can be both recyclable and recycled, like the paper used to print these activities. It contains 50% post-consumer recycled waste paper and 50% unbleached pulp. It can also be made into new paper.

1995
Recycling Recovery Goals



ACTIVE DISPOSAL SITES
1992



Source Reduction

Dana Satterlee, presentation to the Association of Oregon Recyclers 1993 Spring Education Conference

In our urban environment where hundreds of thousands of us go to school, work, play, sleep, eat and survive each day - it's hard to think that we, as individuals, are the source of much of anything that could impact the whole planet! But we can! The great "THEY" who created the glut of consumerism we experience today was/is made up of millions of individuals, you and I and everyone else we know. We really have to admit that "They is Us". Some of us buy, some sell, some design new stuff, while others drive it to market. We often forget that we have power to create new ways to be in the world... but we have the responsibility to ourselves to create our lives to work the way we desire them to be.

As I thought about the subject of Source Reduction, I was reminded of the bumper sticker I see many days on my drive to work... "Think Globally. Act Locally". "Globally" is hard to get a handle on as I sit in my yard looking at the trees and birds. "Locally" is closer... but where does my action start? It starts here---with me, there with you and you and you! We didn't arrive on this planet with a desire to have "lots of things" in our lives. We have developed our lists of "needs" as a result of technological developments, cultural and family role models, advertising, wanting to keep up with the neighbors, enjoyment of creature comforts, and moving into what we think of as the local future of our species. For many of us - more seems better, faster seems necessary, fancier feels affirmative and an elegant 6-course meal feels nurturing.

In the decades of the 60s, 70s and 80s we dwelt in times of focus on self, economic success and upward motion seen as ever-lasting. We became increasingly impatient with the slow speed of social change in comparison to technological progress. We developed an attitude of wishful thinking that said, "if we just keep hoping - the world will change". And it did, but not always for the better.

Environmentally speaking, the late 80s brought visible awareness of air, water and land pollution we could no longer ignore. We began to realize there might be a ceiling to economic well-being. We noticed an increase of jobless and homeless citizens in every corner of our country. We began to feel out of control of our personal lives and of our affect on the planet around us. We were feeling powerless and unable to take action.

However, a shift in our point of view began to change the direction of our "progress". A quick example of shifting points of view and how impacting they are. I think that many of you who live in Oregon and appreciate the open lands will understand this little tale. Last Monday I was on my way through the rolling country-side of Virginia. It was a lush green with open fields of grasses, dogwood and red bud trees a bloom. Land that had been farm land for centuries. The fellow driving the car said he drove a women from Hong Kong a few weeks ago through the very same countryside. The women was aghast at the open hillsides, only occasionally spotted with farm houses. Her comment was "What a waste of space"! Our visions - compiled in part by our points of view, give focus to our actions toward fulfilling our goals. Residents of Hong Kong may see land as space to stack people and buildings...their land is so limited. But we have much land, and appreciate the variety of livings it can provide and options we have

for land use.

About now, I'll bet that some of you are wondering if I stepped into the wrong room. For you may have hoped I would have slides and charts and samples of how Fred Meyer and our sister retailers and manufactures are cutting back on excess packaging to reduce the amount of stuff you have to recycle or throw in your trash at home or at work. I know how exciting it is to see that "avoided waste tonnage" mount on the charts of Source Reduction. And I assure you that many manufactures do make packaging more efficient, cost effective, recyclable and from recycled material now. Less packaging is economically a positive move. Packaging costs money...and reducing the amount of the package part of a product can save a manufacturer millions of dollars each year.

But as I thought about how the actions of just one person can change the world...I felt overwhelmed, hopeless, it looked like a loosing battle. What can I do to help? If I keep waiting for "them" to change - I have no control, no time line, no input, no project I can work on. I though about the educators who came today, and how as an educator myself, I used to search for new keys to unlock pathways in my mind and open up new rivers of creative opportunities with my students. THINKING...first we think... then we act!

How can one person change the direction of planetary resource depletion? What can be done to mend the wounds in the earth over mining, cleanse the sky of noxious chemicals that can destroy plant and animal tissue and degrade the freshness of a deep breath? How can we even begin to make any changes at all with all those big companies out there who don't seem to care about recycling, reuse, or source reduction?

I am the "source" in Source Reduction!

What is Source Reduction anyhow? The basic tenet of source reduction is that by using lesser amounts of material at the source there will be less waste with which to deal in the end. Waste that may be recycled, reused or disposed of through the solid waste system in your town. Materials can be conserved in the product, the packaging for customer use, packaging for shipping and from the product manufacturing process itself. **In simple terms - less stuff equals less waste!**

Each of us represents a slightly different role in potentially reducing the amount of resources used on the planet, and how wastefully or conservatively our resources are managed. We each approach our personal, professional, school, social, and environmental lives from differing angles, and our effects on the planet vary greatly. Some of us over use laundry soap and toothpaste, some run too much water, some over eat, some carefully measure every ounce of nails used to install a new roof on the chicken coop, while others just over sleep! In short, you and I have many opportunities each day to impact how much we use, and to choose to change our habits and needs at any point along the continuum of our lives.

I'd like to share a few simple thoughts about our different roles in source reduction, and perhaps drop an idea or two about change. Change often seems to be one of those things we want other people to do so that we don't have to do it! But nothing stays the same...change is constantly happening in our bodies - in our lives - on the planet. We can embrace the power of change to move ourselves forward, or we can resist the pain of change and try like heck to stay put... but

change will happen anyway. So, lets look at some of our roles and choices and changes in a sort of mini-enviro soap opera.

I am the Manufacturer, the Packager, the Designer

I make products that fill the needs of the lives of my customers. The more products I make, the more money I make, and I like money so I can live comfortably. In the last several years, my customers have started calling and writing to complain that I use too much packaging and make too many items that are not needed. They say they want me to stop using up the planet's resources and stop filling up the landfills with packaging and old products. But I'm confused because they say all this, and still keep on buying all the things I make.

I have seen that I can greatly reduce my cost by engineering my products and packaging so that I use less materials, and package my products more efficiently. I must be careful not to jeopardize the products' safety, but I have cut out a lot of extra packaging materials. Saves a lot of shipping cost, too, for the boxes are lighter now and my freight is charged by the ton.

I have chosen to change some of the ways I manufacture, but customers still buy lots of all products, so I see no reason to drop items from the product line. I listen to customers **most** when their **buying habits change**.

One day one of my retail customers sent me a copy of the Washington Retail Association Preferred Packaging Procurement Guidelines. This document tells about how businesses can reduce packaging, and can use recycled materials in products and packaging to help lighten the load of waste going to landfills and to conserve resources.

This Source Reduction thing seems like a good plan for the planet, but will it cost me money? Maybe I'll risk some research funds on a pilot project, and see how my customers react to a new product line made with the post-consumer recycled material the Guidelines talk about. It is risky, the money and all, you know. I think I'll call the Retail Association for some support and advice. I've never tried any of this environmental stuff before.

I am the Advertiser

My business really drives the buying and needs habits of consumers. Very few general public consumers ever write to me to complain about how I promote products for the companies I represent. But lately my children have come home from school talking a lot about recycling and how people are using too many material goods and using up the world's resources and filing up the landfills with waste. One of my clients has talked to me about a new idea for trying to make some of her products with recycled materials obtained from end-users...she called it post-consumer recycled material. I got to thinking about ways my firm could promote these products. We could work with the package designer to put together a deal that would tell customers that our client is really doing something to help the environment. It's risky, but just might work. Making this product line stand out, giving customers the truth, take the risk, get on this environmental band-wagon that everyone is talking about.

I am the Teacher and the Student

My class is full to the brim with young active students. We're working on our environmental

curriculum. We've studied landfills, looked at different packaging, made paper from recycled fiber, and gone on a field trip to our local recycler. All the students know by heart how to separate recycling at home, and many are in charge of their family's recycling center. I'm looking for some new ideas to unleash these students' minds. This environmental field is all new. We're producing students who need to solve today's problems by developing tomorrow's technologies. It's time to start turning my students on to seeking out opportunities for choice and change that will impact their lives and the community in the future. We have seen many problems during our unit on the Environment and the Community - problems right in our town. I think I'll get together with other 5th grade teachers and develop a unit plan to empower our students to define problems, seek out various solutions, choose plans, and implement programs for change!

I am the Consumer, I am the Source!

I have choices! How often do I just act out of habit? Buy the same old thing just because checking out new products is time consuming, and besides it may yank me out of my comfort zone...I have to THINK, to READ, to EVALUATE the pros and cons of several choices...oh, what the heck...just get that yellow box I bought last week and let's go home and watch TV.

I can think and choose and change what I want and what I do! I can let other people know of my wants and needs...store owners, car makers, friends. I'll talk to people who can help influence change up the merchandising ladder, to marketing and advertising people who create the ads that drag me into stores to buy what they advertise...not necessarily what I need. I can talk to ordinary and exceptional people, can make changes happen by the choices we make on a daily, minute-by-minute basis. You and I can change, and that change will affect the change around us!

We do it every day now. We make daily choices and influence what manufacturers produce. We're just not fully tuned in to our personal power yet. Influence is nothing new. We simply need to focus our awareness on our wants - and target out actions to get what we need.

You know, just a little side story I feel safe enough to tell on myself now. When I first took this environmental job with Fred Meyer, my little girl inside was still operating on the assumption that all corporate decisions were made by "committee". That I had no real power as an individual at my level of management. NOT! I looked around me and found many examples of individuals making choices, deciding and making changes that affected the direction and tone of the company daily. Progress is the result of personal change. It isn't only what THEY do, way out there, away from my influence. It is/can be the product of my desires: thinking, risking, doing, changing, rethinking, changing, doing and re-doing.

I recently visited with a chemical engineer of a major nation-wide manufacturer of plastic products. The company has recently made a most significant shift to using post-consumer recycled resin in a large portion of their product line. They are pulling **huge** amounts of bulk post-consumer plastic out of the Eastern waste streams. I asked the engineer why his company took the financial risk to pursue this new direction. He said it was in great part due to his own <u>personal</u> love and dedication to the environmental movement and recycling. He had devoted many hours to research, and then made the stretch to convince top management of the value of this <u>shift in point of view</u> for their company. A choice, a change, a risk... a successful shift

from the actions of one individual!

It is your ideas and my ideas, joined with your voice, coupled with your activities that changes our neighborhoods, our state, our nation, our planet! New philosophies, new thoughts, dialogue, action, cooperation - these are the dynamic things in which each of us must participate actively - NOW - to move the work of source reduction forward. At home, at school, at work, at play - we can each actively observe, think creatively, discuss and take specific actions locally that will create change with a more global effect.

The specific actions you take will depend on personal and community circumstances. The **KEYS** are to:

- Open up to your ideas, to talk, to network, to say what moves you.
- Explore your passions.
- Encourage each other to pursue curiosities and opportunities.
- Challenge yourself to think beyond today.
- Listen within for creative answers to current questions and problems.
- Dare to ask for what you want.
- Be a teachers to those who seek new vistas.
- Always be aware that you are the student.
- Be willing to hear and accept praise for the good that you do.
- Gather 'round with others who seek personal challenge.
- Love yourself, others, the planet, and acknowledge your place in the universal pattern.
- And remember - **Less stuff equals less waste!**

Household Hazardous Waste (HHW)

Why is Household Hazardous Waste a Problem?

Many products found in your home can pose a health or environmental hazard if you don't dispose of them properly. Anything labeled as toxic, flammable, corrosive, reactive, infectious, or radioactive can threaten family health and safety. Oregon law defines household hazardous waste as any discarded, useless or unwanted chemical, material, substance or product that is or may be hazardous or toxic to the public or the environment, and is commonly used in or around households.

Household hazardous wastes typically fall into one of five major categories: paints and solvents, including strippers and thinners; vehicle fluids such as motor oil, brake and transmission fluid, and antifreeze; pesticides; household cleaners and polishes; and miscellaneous items such as batteries, art supplies, pharmaceuticals and some cosmetics.

According to national estimates, each home contains from three to eight gallons of hazardous materials in kitchens, bathrooms, garages, and basements. Throwing them in the garbage can threaten sanitation workers, who can be injured or poisoned by acids, fires, and explosions. Hazardous wastes that reach our landfills can leach into the soil, polluting water and threatening all living things. Substances poured into Oregon's household drains and toilets go into the sewage treatment process, eventually impacting fish and wildlife. Substances poured onto soil or street or into storm drains are carried into our streams. As little as one pint of solvent can

cause measurable fish kills.

How to Minimize Hazardous Waste In the Home

- Use safer alternatives.
- Read labels before purchasing. Watch for the words "caution", "warning", and "danger". Follow label directions.
- Buy only what you need and will use up.
- If you do have products left over, give them to friends, neighbors, or charitable institutions to use up.

Handle Hazardous Waste the Recommended Way

Safe disposal of household (or any) hazardous waste is critical to our health and safety. Wastes collected at special events are treated at licensed hazardous waste management facilities, where they are either burned as a supplemental fuel, recycled, or specially landfilled, incinerated or chemically neutralized. Disposal of a 55-gallon drum of household hazardous waste collected at a collection event can cost between $150 and $700. Each participant in a HHW collection event brings in an average of 116 pounds of waste (Source: Dana Duxbury and Associates.)

- Watch for Household Hazardous Waste Collection Days. Your community may be among those holding HHW Collection Events, where residents can bring unused and unwanted hazardous substances to a central location for proper sorting and disposal by local officials and hazardous waste collectors.
- If you live in the Portland metropolitan area, materials can be taken to the Household Hazardous Waste facilities run by Metro. See contact information in **Section Five: The Resources** for more information.

Until there is a HHW Collection Event locally:

- Keep containers upright, tightly closed, and with labels intact.
- Keep unused portions and empty containers. (Check labels to see if an empty container can be triple-rinsed and safely discarded in your household garbage.)
- Never mix substances or pour into other containers.
- Avoid burning or reusing empty containers.
- Keep out of reach of children, pets and wildlife.

What Should You Know about Hazardous Waste?

Many home and garden products contain potentially dangerous chemicals. They may cause injury to living things or damage to the environment if not used and disposed of safely.

Antidotes listed on product labels are often not correct. A random survey conducted by the New York Poison Control Center of 1,019 household products found 85 percent of the labels had inadequate or erroneous first aid information, while 6% were wrong, giving first aid advice that was potentially dangerous to the victim. Always call a medical professional or the Poison Control Center for advice when a poisoning occurs.

If something spills, your first concern must be for your own safety. If you have been exposed to toxic materials, call the Oregon Poison Control Center at 1-800-352-7165 (In Portland, 494-8969.) For medical emergencies or large spills, call 911 or your fire department. Meanwhile,

- Read the product label for exposure and spill information.
- Keep the area well ventilated.
- Keep children and pets away.
- Wear gloves and protective clothing.
- Contain and cover the spill with absorbent material like cat litter, clay, or sand.
- Sweep and scoop the material into a container with a lid or doubled plastic bags. Secure well.
- Finally, wash the surface well with soap and water.

You should have received a copy of the brochure *What is Household Hazardous Waste?* with this Teacher Resource Guide. It contains a list of typical household hazardous wastes, disposal suggestions, and substitutes and precautions for each. If you do not have a copy of the brochure, please call DEQ at (503) 229-5913 or 1-800-452-4011 (in Oregon) and request it. In addition, DEQ has a series of fact sheets available on Alternatives to Household Hazardous Waste and other issues related to this topic that can be useful in your classroom. You can order these materials by telephone, or send your request to DEQ Solid Waste, 811 SW 6th Avenue, Portland, OR 97204.

Another excellent resource for materials on Household Hazardous Waste is the Metro Recycling Information Center, (503) 234-3000. If you are in the Portland metropolitan area, Metro Public Affairs provides classroom visits, a puppet show, and other valuable resources on this topic. See contact information in **Section Five: The Resources**.

Special Concerns: Plastics

The Facts on Plastics Source Reduction

The information in these fact sheets is adapted from a series developed by the U. S. Environmental Protection Agency Office of Solid Waste in 1990 in their Report to Congress on Methods to Manage and Control Plastic Wastes.

Discarded plastic products and packaging make up a growing proportion of municipal solid waste. By the year 2000, the amount of plastic we throw away will increase by 50 percent. Current volume estimates for plastic waste range from 14 to 21 percent of the waste stream. By weight plastics contributed seven percent, and less than four percent of plastic waste is currently recycled. Additionally, some plastic items end up as litter that poses ecological risk to the marine environment and aesthetic and economic loss. These facts, and EPA's belief that source reduction is the best method for reducing the environmental impacts of wastes, have led to considering source reduction of plastics.

Source Reduction Defined
Source reduction means decreasing the amount or toxicity of the materials that we throw away. Effective source reduction promotes the use of products that generate the smallest environmental impacts.

Benefits of Reducing Plastic Wastes
Plastics are a target for source reduction because of their rapid growth in the municipal waste

stream. Additionally, plastics contain additives (e.g. colorants, stabilizers, plasticizers) that may include toxic constituents such as lead and cadmium. Plastics contribute 28 percent of all cadmium in municipal solid waste and approximately two percent of all lead. EPA is studying substitutes for these two additives of concern.

Any source reduction of plastics, however, must be accomplished within the goal of reducing the amount and toxicity of the entire waste stream. For example, replacing a plastic cup with a paper cup will not necessarily benefit the waste stream as a whole, even though the amount of *plastic* waste is reduced.

How Can We Reduce Plastics in the Waste Stream?
Volume reduction can be accomplished in a number of ways by both consumers and manufacturers. For example, consumers can reuse products and packages as much as possible, avoid use of disposable items such as cups and dinnerware, buy packages that are easily recycled, and try to buy concentrates, bulk foods, and products which require less packaging. Manufacturers can reduce volumes by using less material in their packages and products, and using economics of scale in packaging (e.g. concentrates or large "economy size" packaging). The can also reduce packaging waste by manufacturing packages with resins which are commonly recycled.

Toxicity reduction must be done by manufacturers of plastic products by replacing toxic constituents with non-toxic or less harmful materials.

Facts on Degradable Plastics

Degradable Plastics Defined
Degradable plastics are engineered to be less resistant to degradation than "normal" plastic. The following are currently the most prominent technologies being investigated for consumer products and packaging:

- Photodegradation adds a sun-sensitive component that triggers physical disintegration when exposed to sunlight.
- Biodegradation adds a natural polymer such as corn starch or vegetable oil that degrades into smaller pieces of plastic when exposed to the appropriate environment.

Do Degradables Fit into Solid Waste Solutions?

- Reduction of Waste: Degradable plastics do NOT reduce the volume or toxicity of waste produced. In fact, for certain applications, additional plastic may be required to offset the weakening effect of adding biodegradable components. The amount of waste may decrease once (and if) degradation occurs, but the amount of waste produced is the same.
- Landfilling: Degradation in a landfill occurs very slowly. Even cabbages and carrots have been found in recognizable form in landfills after many years of burial. Enhancing the degradability of plastics will have little if any effect on landfill operation or space.
- Recycling: Plastic recyclers fear that degradable plastics will contaminate the recycled plastic waste stream, resulting in products that do not perform well. As we learn more about how degradable plastic bags work, however, they may prove useful in collecting and composting yard waste.
- Incineration: Degradable plastics will have little, if any, effect on incineration. In most cases, the waste will be combusted before degradation begins.

If they perform appropriately, degradable plastics may help reduce risks to wildlife and aesthetic damage from items such as six-pack beverage rings, cups, and wrappers. Oregon, in fact, has passed legislation requiring that six-pack beverage rings be degradable to reduce the threat to marine animals. There is, however, some concern as to whether smaller bits of plastic may pose a greater threat to wildlife in their digestive process. Additionally, there is a question as to whether degradability might encourage littering. EPA has initiated a research effort to answer some of these questions.

The Facts About Plastics in the Marine Environment

Plastics Found in the Marine Environment
The majority of items collected during EPA's harbor surveys and beach cleanups are plastic. These efforts have identified a wide variety of plastic items, including plastic pellets (the raw materials plastic processors use to make plastic products); plastic bags and sheeting; fishing gear (e.g., nets, traps, and monofilament lines); tampon applicators, condoms, beverage ring carriers, plastic straps, and a variety of plastic packaging.

Where Does this Plastic Come From?
Plastic wastes come from both marine-based and land-based sources. Possible land-based sources include plastic manufacturers and processors, sewage treatment systems, stormwater runoff, solid waste disposal activities (e.g., barges), and litter. Marine-based sources include: intentional waste disposal from vessels (now prohibited by Coast Guard regulations); waste disposal from off-shore oil and gas platforms; and accidental loss of fishing gear.

The major sources vary from region to region. For example, fishing gear loss is a major concern in the North Pacific, while plastic from sewer-related activities is a problem in the Northeast.

Problems Caused by Plastic Wastes
The major impacts of marine plastics are entanglement and ingestion by marine animals, and aesthetic and economic loses caused by lost fishing gear and by litter on beaches. Entanglement affects seabirds, seals, whales, turtles, fish and crustaceans, and may have an adverse impact on the populations of endangered species. Fish continue to be caught and killed by lost "ghost" nets. Ingestion of plastic wastes is particularly serious among birds and turtles, who mistake plastic items for food. Impacts include injury to the digestive tract, intestinal blockage and starvation. Aesthetic and related economic losses associated with marine debris may be sever (e.g. loss to the tourism and fishing industries). For example, beach debris incidents in New Jersey and New York in 1987 and 1988 cost an estimated $1 billion.

Plastics: The Facts About Production, Use, and Disposal

The Major Plastics and Their Uses
The term "plastics" encompasses a wide variety of resins or polymers with different characteristics and product uses. Over 65 billion pounds of plastic were produced in the U.S. in 1992.

Five resins account for nearly 60 percent of all plastics used by consumers. These are low-density polyethylene, used in garbage bags; polyvinyl chloride, used in cooking oil bottles; high-

density polyethylene, used in milk jugs; polypropylene, used in car battery cases; and polystyrene, used in disposable food containers. The resin polyethylene terephthalate is produced in much small quantities, but is familiar to consumers as the plastic used in soft drink bottles. One-third of all plastics is used in packaging. Because packaging has a short lifetime, it makes up a large part of the plastic waste stream.

Where Do Plastic Wastes Go?

About 80 percent of all municipal solid waste is landfilled nationwide, while 10 percent is incinerated and 10 percent recycled. In Oregon, about 66 percent of muncicipal solid waste is landfilled, 6 percent is incinerated, and nearly 28 percent is recycled. Because only a small percentage of plastic is recycled (less than four percent), virtually all plastics are landfilled or incinerated.

Plastics make up about seven percent (by weight) of the municipal solid waste stream and about 14 to 21 percent by volume.

Do Plastics Cause Disposal Problems?

The slow degradation of plastics is not a significant factor in landfill capacity. Research has shown that other constituents (e.g., paper, wood, food wastes) also degrade very slowly.

Plastics contain additives, however, such as colorants, stabilizers and plasticizers, that may include toxic constituents such as lead and cadmium. Plastics contribute 28 percent of all cadmium in municipal solid waste and approximately two percent of all lead. Data are too limited to determine whether these and other plastic additives contribute significantly to leachate produced in municipal solid waste landfills.

Plastics that contain heavy metal-based additives may also contribute to the metal content of incinerator ash. EPA is conducting a study of substitutes for lead- and cadmium-based additives.

Because of its resistance to degradation, littered plastics debris can have a particularly serious effect in the marine environment. Enhancing the degradation of plastics has also been offered as a solution. Data are too limited, however, to determine their exact role.

EPA believes source reduction and recycling will provide the most significant results in reducing the impact of plastics in the environment.

Where Can I Find Additional Information?

Call EPA's Resource Conservation and Recovery Act/Superfund hotline for a free copy of the following reports:

- Executive Summary of EPA's Report to Congress on Methods to Manage and Control Plastic Waste (EPA/530-SW-89-051A)
- The Solid Waste Dilemma: An Agenda for Action (EPA/530-SW-89-019)

The toll-free number is 1-800-424-9346 or TDD 1-800-553-7672 for the hearing impaired. Ask the Hotline for information on ordering the full Report to Congress, and about current efforts on municipal solid waste source reduction. The hotline is open from 8:30 a.m. to 7:30 p.m. EST, Monday through Friday. Also ask the hotline for other useful materials for recycling and environmental education.

Plastics at Sea

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Plastic materials are increasingly polluting oceans and beaches; sea birds, marine turtles, whales, and seals are suffering as a result.

by
D.H.S. Wehle and Felicia C. Coleman

Throughout the 1970's, many biologists studying feeding habits of sea birds in different oceans told the same story: the birds were eating plastic. The biologists learned that other marine animals also were eating it. At the same time, little pieces of plastic turned up in both the Atlantic and Pacific oceans. Plastic debris was retrieved in the Bering Sea and Britain's Bristol Channel. So many plastic pellets washed up in New Zealand that some beaches were literally covered with "plastic sand." Marine scientists around the world became aware of a new ecological concern: plastics at sea.

Two forms of plastic exist in oceans: "manufactured" and "raw." Manufactured plastic is mainly refuse from transport, fishing, and recreational vessels. Raw plastic particles are materials used to manufacture products. These particles, about the size of the head of a wooden match, enter the ocean from inland waterways and from firms that manufacture plastic. They are also often lost from ships, particularly when freighters load and unload. Sometimes large quantities are even deliberately dumped into the sea.

Plastics turn up everywhere. Along Great Britain's coast there are about 2,000 plastic pieces per square foot. Near Aukland, New Zealand, 100,000 pieces of plastic were found every three feet of beach. Particles have also washed up on beaches in Texas, Washington, Portugal, Columbia, Lebanon, and at the remote Aleutian and Galapagos Islands.

Much of what we know about the amount of plastic and where it is found in the world's oceans comes from sampling surface waters. Between 1972 and 1975, there were plastic particles in samples collected between Cape Cod and the Caribbean Sea. Most entered the ocean from the coast of southern New England, and the greatest amounts were usually in water near the coast. Raw plastic was everywhere in the open ocean. This suggests that winds and currents are very important in spreading and concentrating particles in certain regions.

Many animals that forage in the marine environment will encounter and occasionally eat, or ingest, plastic materials. One of the first records of plastic ingestion appeared in 1962. Four years later, researchers in the Hawaiian Islands found plastic in the stomach contents of young albatross. Apparently, it was fed them by their parents.

For the most part, early reports were treated as curious stories in studies of a few sea birds. During the 1970's and early 1980's, these stories increased, and biologists were surprised to find how often there was plastic in some North Pacific and North Atlantic sea birds' stomachs. Feeding habits of marine birds in southern oceans have not been studied as much, but plastic ingestion has been reported there, also. To date, approximately 15 percent of the world's 280 species of sea birds are known to have ingested plastic.

Sea birds eat a wide array of plastic objects: raw particles; fragments of processed products; detergent bottle caps; polyethylene bags; and toy soldiers, cars, and animals. Marine turtles, on the other hand, consistently select one item: plastic bags. In the past few years, plastic bags were found in the stomachs of four of the seven species of marine turtles. Polystyrene spherules were found in digestive tracts of eight species of fish in southern New England waters. They also turned up in sea snails and in several species of bottom-dwelling fish in southwestern Great Britain.

Marine mammals also take part in the plastic feast. Many whales' and dolphins' stomachs contain plastic sheeting or bags. Minke whales have been sighted eating plastic debris thrown from commercial fishing vessels.

The obvious question is, why do marine animals eat plastic? One researcher says it's because the color, shape and size of plastic looks like the animals' natural food. In some auklets, for example, 94 percent of all the ingested plastic particles were small, light brown, and looked a lot like the small crustaceans which the birds usually eat.

Marine turtles also mistake plastic objects for food items. Transparent plastic bags apparently trigger the same feeding urge in sea turtles as do jellyfish, their major food item.

Sea birds, marine turtles, and marine mammals all eat plastic. So what? Perhaps it doesn't affect their health. But evidence is growing that plastic causes intestinal blockage. In the stomach of one starved turtle, a ball of plastic nine feet wide and twelve feet long was found. Green turtles off Costa Rica die because of the large number of plastic banana bags they eat.

But 20 dead wading birds discovered on a beach in southern California, all with plastic in their digestive tracts, present a less clear case. Did the birds suffer a bad response after eating plastic? Or, because of a reduced food supply, did they eat plastic in an effort to prevent starvation? The same question applies to other cases of starved animals that have eaten plastic. At this time, we don't know.

We do know plastic is almost indigestible. Individual pieces in the gut may reduce an animal's sensation of hunger. This slows their feeding activity. Plastic may also cause ulcerations in the stomach and intestinal linings, and may damage other organs and body structures. Some toxic ingredients in plastic may cause eggshell thinning, strange behavior, even death.

Sometimes plastic eaten by animals feeding at low levels shows up in higher-level consumers. The remains of a broad-billed bird, and the plastic pellets it ate, were found in the castings of another animal a great distance away. Plastic pellets have been traced through a food chain from fish, to blue-footed boobies, to short-eared owls.

A more obvious effect of plastic pollution is aesthetic. Whether we go to the woods, mountains, or ocean to escape civilization, we find nature often spoiled by human litter. It is disturbing to see a young pelican dangling helplessly from its nest by a fishing line, a whale rising to the surface with its flukes covered in netting, or a seal's wounds from a plastic band cutting into its flesh. Unfortunately, such observations are becoming common, another effect of plastics at sea.

During the last 20 years, fishing has increased dramatically and with it, the amount of fishing debris dumped into the sea. Also, the kind of fishing equipment has changed. Traditionally, fishing nets were made of natural materials like hemp, cotton and flax, which sank if they didn't have bouys. They disintegrated within a relatively short time and, because of the size of the fibers, were mainly avoided by diving sea birds and marine mammals. With the invention of synthetic fibers, different kinds of nets came into use. These new nets were more bouyant and longer-lived than the ones they replaced. Some of them were nearly invisible under water.

The change in netting materials has led to a tragic increase in deaths of air-breathing animals. For instance, during 1972-1976, the incidental (accidental) catch of the birds called thick-billed murres was three-quarters of a million murres per year. In 1980, 2,000 sea turtles off the United States' southeast coast drowned when caught in shrimp trawl nets. Another kind of net-related death is called entanglement and refers to any animal caught in a net lost or discarded at sea. Some government officials estimate that about 50,000 northern fur seals die in the North Pacific each year as a result. When washed ashore, the abandoned nets may also threaten land birds and mammals. In the Aleutian Islands, for example, a reindeer became entangled in a gill net from Japan.

Sea birds in recreational waters or coastal dumps can become tangled in the plastic yokes used on six-packs of beer and soda pop. Gulls with these rings around their necks can be strangled when the free end snags on something like a tree limb. Pelicans, which plunge into the water to feed, risk diving into these yokes. If the rings become wedged around their bills, the birds may starve because they can't open their mouths to eat.

Occasionally, animals will attach themselves to large pieces of plastic floating at sea which may change where these animals normally live. Marine birds worldwide put plastic litter in their nests which may be harmful because chicks can become tangled in it and die.

Two laws affecting pollution by plastic have been adopted. The Clean Water Act says all significant polluters must obtain a federal permit limiting discharges of solid matter. The Ocean Dumping Act prohibits dumping plastic materials at sea. But these do not solve problems right away. Fishermen who claim to have lost their nets accidentally cannot be held responsible. Illegal large-scale dumping at sea is hard to detect. Laws must be tightened, but enforcing them is a bigger problem.

Water pollution and litter problems in the oceans were talked about at a 1972 United Nations Conference on the Human Environment. Two treaties were adopted. One prohibits ocean dumping of plastic material, and the other controls pollution from oil, packaged things, sewage, and garbage. Neither has been adopted by all nations, but they are a start toward worldwide control of marine pollution.

The quantity of plastics in the world's oceans will likely increase. Ironically, the reasons that plastic is good for so many uses--its light weight, strength and durability--lead to most problems with it at sea.

With plastic's long life and projected increases in production, one thing is clear: more plastic will be deposited in the marine environment than will disappear from it. One study of plastic on beaches found that in one year, 550 pounds of plastic litter were added to less than a mile of beach. Plastic items which washed ashore over a two-year period on another beach increased over 250%.

Problem solutions can come from both inside and outside the plastics industry. The technology to manufacture biodegradable plastics is available. One of the beauties of plastic is that its properties can be altered and its life expectancy prescribed. Another solution is in recyclable plastics. At least, all countries should require that the discharge of plastic particles from industrial plants be reduced before the particles enter waterways.

Consumers and industry share the responsibility to reduce the amount of plastic in the sea. Recreational boaters, beach-goers, and commercial fishermen all discard plastic refuse. Preferably, no trash, plastic bands, netting, or other debris should be tossed overboard or left on a beach.

The first step in fighting plastic pollution is to alert both industry and the public to the seriousness of the problem and the need to do something about it soon. Education is a beginning, and public awareness of a problem, combined with the resolve to correct it, can bring dramatic results.

"Green" Advertising Claims: Points to Consider

Like many consumers, you may be interested in buying products that are less harmful to the environment. You've probably seen products with such "green" claims as "environmentally safe," "recyclable," "degradable," or "ozone friendly."

But what do these claims really mean? How can you tell which products really are less harmful to the environment? This fact sheet offers some pointers to help you decide.

Look for environmental claims that are specific.

To evaluate environmental claims, look for product labels with *specific* information about the product or its packaging. For example, if a label says "recycled," check *how much* of the product or packaging is recycled.

A growing number of labels on "recycled" products tell *where* the recycled material comes from. "Post-consumer" material comes from previously used business or consumer products, such as newspapers, plastic bottles, glass containers, or aluminum cans. "Pre-consumer" material, in contrast, is basically manufacturing waste. For example, an envelope manufacturer might recycle the clippings left over when envelopes are cut from paper. These clippings could be made into other paper products instead of being thrown away.

Some products and packages state that they *use less material* in the first place than previous or competing products. See if the claim says exactly what has been reduced, by how much, and compared to what. A claim such as "20 percent less waste" does not tell the whole story. Instead, look for claims such as "20 percent less packaging than our previous package."

Labels with "recyclable" claims mean that these products can be collected and made into useful products. This is relevant to you, however, only if this material is collected for recycling in your community. Contact your local recycling office, trash hauler, or scrap dealer for this information.

Look for claims that clearly state whether they apply to the product, its packaging, or both. For example, the claim "recycled content" alone may not give you this information.

Be wary of overly broad or vague environmental claims.

Just as specific information about the environmental merits of products can be helpful, overly general or vague claims provide little information to help you make purchasing decisions. Labels with unqualified claims that a product is "environmentally friendly," "eco-safe," or "environmentally safe" have little meaning, for two reasons.

First, all products have *some* environmental impact, though some may have less impact than others. Second, these phrases alone do not provide the specific information needed to compare products and packaging on their environmental merits.

Similarly, claims like "safe in a landfill" or "safe for incineration" provide little help in choosing among products. Most consumer products pose little environmental risk when disposed of in properly designed and operated landfills or incinerators. Disposal safety depends more on how a waste facility is designed and managed than on the characteristics of any single material that is disposed.

Degradable materials will not help save landfill space.

Some products claim to be "degradable." *Biodegradable* materials, like food and leaves, break down and decompose into elements found in nature when exposed to air, moisture, and bacteria or other organisms. *Photodegradable* materials, usually plastics, disintegrate into smaller pieces when exposed to enough sunlight.

Either way, however, degradation of any material occurs very slowly in landfills, where most garbage is sent. That's because modern landfills are designed, according to law, to minimize the entry of sunlight, air, and moisture into the landfill. This helps to prevent pollutants from the garbage from entering the air and drinking water supplies, but also greatly slows decomposition. Even organic materials like paper and food may take decades to decompose in a landfill.

In contrast to landfills, composting takes advantage of degradability. It turns degradable materials into usable compost—humus-like material that enriches the soil and returns nutrients to the earth. Some people compost yard trimmings and some food scraps in their back yards. Many communities collect leaves, grass, and other yard trimmings for composting. A very small number of communities are experimenting with large-scale composting of all the organic materials in collected garbage. When you see a "compostable" claim on a product or package, check to be sure you have access in your community to a facility that accepts that material for composting.

Cleaning products like detergents and shampoos often display "biodegradable" claims. In general, most of these products *will* degrade in wastewater systems—which has been true for years.

Check "ozone friendly" and "CFC-free" claims carefully.

CFCs are chemical substances called chlorofluorocarbons that can deplete the earth's protective ozone layer. They are used to provide coolant in air conditioners and refrigerators, to clean electronic parts, and to make certain plastic foam products. In 1978, CFCs were banned for use as propellants in nearly all consumer aerosol products.

HCFCs, or hydrochlorofluorocarbons, are sometimes used as substitutes for CFCs. While HCFCs are much less damaging to the ozone layer than CFCs, they still

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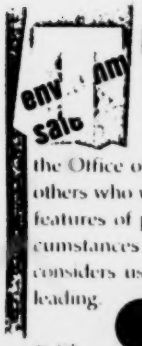
cause some ozone depletion and are thus not safe for the ozone layer.

By law, CFCs, HCFCs, and other ozone-depleting substances are being phased out in all products and manufacturing processes over the next several years. Beginning in 1993, products containing or made with the most harmful ozone depleting substances must be labeled to indicate this. Until then, you may not be able to tell from the label whether a product contains or is made with an ozone depleting substance unless you contact the manufacturer.

Think about ground level ozone, too.

on't confuse the ozone layer with ozone at the ground level. The ozone layer in the upper atmosphere is needed to prevent the sun's harmful radiation from reaching the earth. When ozone develops at the ground level, it forms smog, which can cause serious breathing problems.

One factor contributing to the formation of ground level ozone, or smog, is the release of substances called VOCs, or volatile organic compounds. Common VOC substances are alcohols, butane, propane, and isobutane. Although emissions from cars and factories are the major source of VOC releases to the environment, some consumer products also contribute to the problem. Products such as household cleaning products, floor polishes, charcoal lighter fluid, windshield washer fluid, and hair styling spray, gel, and mousse—whether in aerosol cans or spray pumps—may contain VOCs.



Did you know...

he Federal Trade Commission recently issued guides, with the cooperation of the U.S. Environmental Protection Agency and the Office of Consumer Affairs, for manufacturers and others who wish to make claims about the environmental features of products. These guides explain various circumstances in which the Federal Trade Commission considers use of "green" advertising claims to be misleading.

For More Information

Contact the Environmental Protection Agency:

EPA

If you would like information about EPA's publications on source reduction, recycling, and other waste management issues (including "The Consumer's Handbook for Reducing Solid Waste"), call the RCRA Hotline at 800-424-9346. (In the Washington, DC, area, call 703-920-9810.) If you would like information about EPA's publications on air pollution issues, call the National Air Toxics Information Clearinghouse at 919-541-0850.

Contact the Federal Trade Commission:

If you have questions or concerns about environmental advertising claims, write: Correspondence Branch, Federal Trade Commission, Washington, DC 20580, or call 202-326-2222. If you would like a copy of the "Guides for the Use of Environmental Marketing Claims," call 202-326-3753.

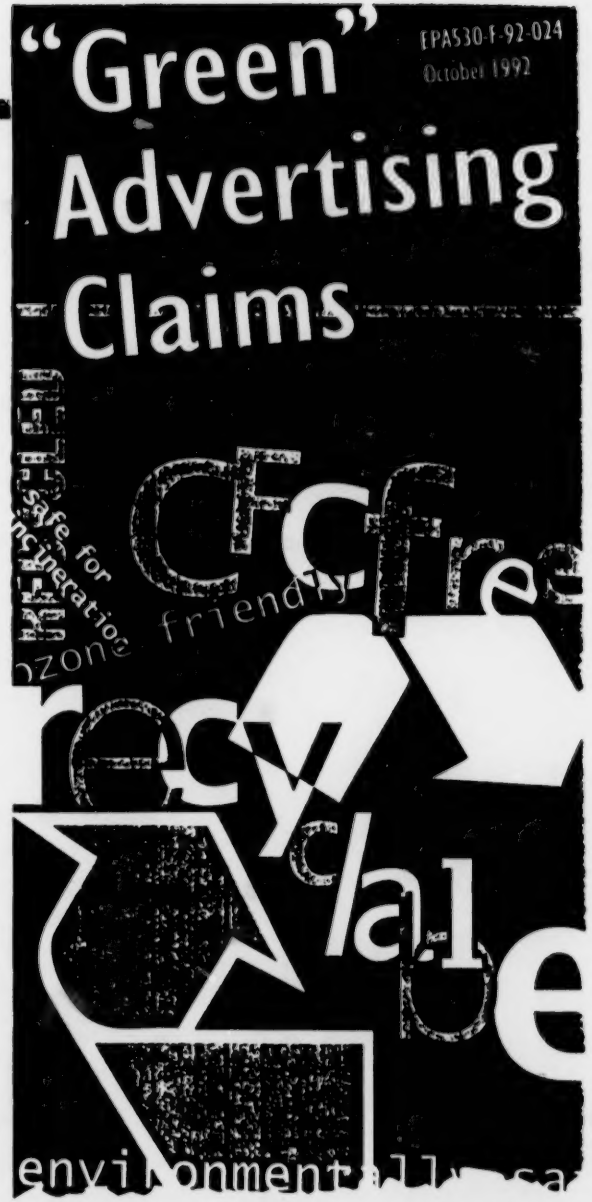
Contact the U.S. Office of Consumer Affairs:

CONSUMERS EDUCATORS BUSINESS GOVERNMENT

If you would like more information about "green" advertising claims and other consumer topics that are included in the "Consumer's Resource Handbook," a free self-help guide listing more than 2,000 consumer contacts, write: Handbook, Consumer Information Center, Pueblo, CO 81009.

"Green" Advertising Claims

EPA530-F-92-024
October 1992



CONSUMERS EDUCATORS BUSINESS GOVERNMENT

EPA

Responsible Stewardship

The future of our environment lies in individual citizens accepting personal responsibility for stewardship of the air, land and water around us. As the Chinese philosopher Lao-Tsu said,

> In the end, we will conserve only what we love. . . we will love only what we understand. . . we will understand only what we are taught.

If each of us is to act responsibly, we must first learn about the world, the interactions of ecosystems, the effects of human behavior on environmental capacity, and the impact of individual, daily decisions on the balance of nature. Aldo Leopold, one of the early members of the conservation movement said

> We abuse the land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect.

When the Department of Environmental Quality was established, goals for the new agency were clearly defined by the Legislature:

> Restore and maintain the quality of the state's air resources at an acceptable level; achieve and maintain the highest practicable level of quality of public waters for all beneficial uses; assure adequate collection, handling, recycling and disposal of solid and hazardous waste to protect the quality of Oregon's environment.

The goals have always been clear. But the methods for achieving them have become increasingly more complex. Tools that provided the first substantial measure of progress are not fully appropriate for addressing all the environmental problems on the horizon. The issues involved in controlling hazards to the environment are complex and full of uncertainty. These environmental decisions may result in enormous expense, not only for cleaning up and regulating pollutants, but also in jobs that could be affected by decisions to protect the environment.

The sources of pollutants are changing from more easily controlled and regulated industrial and municipal discharges to more diverse sources of pollution--garbage, cars and wood stoves--resulting from individual life-styles and consumer choices. People need to understand how they contribute to environmental problems and what they can do to help solve those problems. Continued progress in environmental protection will require new control strategies whose success will depend on cooperation between governments and the public.

In the past, there was widespread agreement over what the major environmental problems were, and how they should be dealt with. Most of those problems were highly visible in our air, land and water. We have made enormous improvements in Oregon's environmental quality. The amount of pollution emitted into the air or released into rivers and streams has been dramatically reduced. Today, industries and municipalities do not question the value of environmental safeguards. Now the challenge is to respond to new and changing needs. This means taking a hard look at environmental programs now in place and asking questions:

- Are the programs adequately protecting the public health and the environment?
- Have the environmental priorities changed?
- How do we deal with the question of toxics?
- What types of risks are we willing to accept?

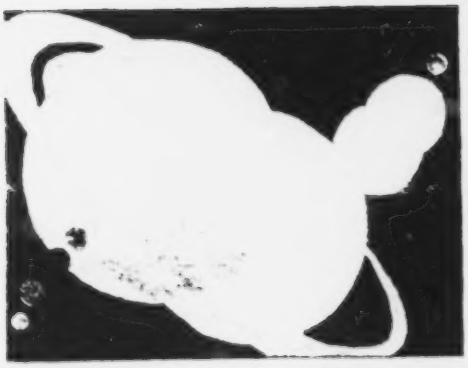
Concerns over new problems (negative effects of small amounts of pollutants that had previously been thought to be harmless, for example), new pollutants, new sources of pollution, and new priorities at the local, state, federal and world level are making the questions harder, and the answers harder still. Substances exist now that can be extremely hazardous--in the words of William Ruckelshaus, the first head of EPA, the environment is a "minefield of risks". A "safe environment" may be an impossible goal. As a result, the current emphasis at the Environmental Protection Agency is pollution prevention--educating the public about the impacts that their personal decisions can have to reduce the problems by changing personal habits.

Evaluating and setting environmental priorities will take three essential ingredients--good information, an informed public, and a legitimate and workable process. We can't solve all the problems, especially in an era of limited resources. Rational choices must be made with the aid of new analytical techniques such as risk assessment. Setting priorities will ensure that money spent on the environment will produce the best result. Establishing priorities will be accomplished by weighing some important factors:

- Cost-Benefit Analysis--Since an optimal use of cost-benefit analysis occurs when all factors affected by a decision can be accurately represented in dollars, this is a difficult process in environmental issues where stability of ecosystems and life-style preferences reflect social values for which there is no market price.
- Risk-Benefit Analysis--Risk-benefit analysis balances the economic benefits of a polluting activity against the associated risks to health and the environment.
- Cost-Effectiveness Analysis--This begins by accepting the desirability of a particular outcome. It does not weigh risks against benefits, or put a dollar value on benefits; it only looks for the least-cost path to reach a given goal, such as the 50 percent waste reduction standard.

Public education and involvement are the critical components to make most solutions to the new generation of environmental problems work. Many fundamental choices between the problems to attack and the solutions to pursue require the public to state its preferences. How much do we want public health protection vs. protection of the ecology? How much of the environment are we willing to sacrifice for economic development? Where do we draw the line and determine what is the acceptable cost? Who pays? Individuals have two important roles to play in the future of Oregon's environmental quality. One role is to reduce their individual contributions to environmental problems. Some examples of things individuals can do to help include: keep vehicles tuned and running properly, use mass transit where it is available, dispose of wastes properly, rethink our purchasing habits to reduce the number of goods we purchase and select purchases with the least negative environmental impact. The second role is to become involved in the decision-making process. The decisions about how to solve the myriad of complex environmental issues facing us today must be made by the citizens and future citizens of Oregon. Active involvement of individuals is critical to success in protecting Oregon's environmental quality.

the methods



ONE SOLAR SYSTEM.

ONE WORLD.

ONE CAN.

RECYCLE.

Section Three: The Methods

- Rethinking Recycling: Why Teach About Garbage? (Interdisciplinary Teaching)
- Getting Dirty: Conducting a Garbage Audit
- School Recycling Programs: How to Use the Handbook Oregon Schools Formula for Success in Waste Reduction
- Taking Advantage of Technology
- Using Simulations and Games
- The Oregon Green Schools Network: A Vision of the Future
- Working with Parents, Community and Classroom Volunteers
- Recognizing Involvement and Success

Rethinking Recycling: Why Teach about Garbage?

Back to the Basics. The good old basic skills: readin', 'ritin', and 'rithmetic. Remember when education was easy? No lists of outcomes, no electives, no "interdisciplinary" instruction? And then, somewhere in the '80's (or was it really the '70's? or even the '60's!) someone started reforming education. First it was relevance. Then it was competencies. Team Teaching. Modular classrooms. Year-round school. The list of "reforms" kept getting longer and longer. Now, in Oregon, there is the Schools for the 21st Century movement. More reform, only this time, it's bigger than ever. The latest reform tries to take the best of everything and put it all into one school system. Longer school years, cross-discipline teams, teaching identified outcomes, preparing students to be citizens in a new millennium. And then they say "Teach Recycling." Do you ever feel like shouting "Stop the world, I want to get off?" Instead, it might be easier to understand how it all fits together.

Let's start with outcomes. The overall structural principle in most educational reform programs is to look at what we hope students will know and do as a result of the time they spend in school. Perhaps the best way to identify the necessary outcomes of education is to begin by looking at the world in which students will live and the knowledge, skills and competencies every individual will need in order to survive in that world. According to the America 2000 report that outlined national education goals in 1991, the skills necessary for success in the world of the future include competency in a wide range of subject matter including English, mathematics, science, history and geography; the ability to use the mind well (critical thinking, problem solving, lifelong learning); skills to exercise the rights and responsibilities of citizenship; and the skills necessary to productive employment in a changing, global economy. According to a summary report for the Oregon Educational Act for the 21st Century (also known as HB 3565 or the Katz Bill) "All of our people not just a few, must be able to think for a living, adapt to changing environments, and to understand the world around them." Outcomes that allow us to live and let live. Outcomes like being able to evaluate a solid waste landfill siting proposal and make recommendations regarding its approval.

In a 1991 forecast of trends shaping the world of the 21st century, Marvin Cetron and Owen Davis (Crystal Globe: The Haves and Have-Nots of the New World Order, St. Martins Press, 1991, as summarized by the World Future Society in it's The Futurist magazine), of 50 significant trends that will affect the world in which today's students will live, many of the critical trends relate to the environment and technologies that impact the future of the earth itself. In other words, if student are going to successfully live in the world, they need to understand the world itself and the ways that human behavior and decision-making can impact that world for better or for worse. What is that but environmental education!

Critical to understanding that environment is a knowledge of the inter-relatedness of the environment and every choice made by participants in the earth's ecosystem. So what does that have to do with garbage? Nature's solution to the garbage problem is to recycle used resources through the water cycle, decomposition, the air cycle, etc., so that finite natural resources are preserved and the earth can continue. When humans started making the decisions, some of that natural balance was destroyed. First, piles of garbage were just left

behind. As weather patterns and increasing population changed the migration patterns, people started covering or burning their garbage in an effort to decrease its impact on their lives. Now, space is running out in many developed nations, and there is no place to put the garbage. Humanity must find a way to eliminate the garbage, and that leads to a new kind of cycle: recycling used resources. That, however, is not the whole solution. Instead, every citizen on earth needs to re-assess the use of resources.

The important thing is not just to teach recycling, but to teach the larger context--how choices about resource use effect the availability of resources. How fewer resources need to be stretched to provide for more people. How one individual's consumer choices can impact the availability of resources. The decisions related to our solid waste are by their very nature interdisciplinary. A pile of garbage provides questions of every kind: scientific, mathematic, social, political and economic policy, aesthetic, industry and consumerism, medical, ethical, communications--there is not a "subject" matter that is not impacted by garbage! It is this inter-relatedness that is the driving force behind educational reform. If students do not see the relevance of any individual topic to the bigger picture (their own lives), they will not successfully learn about it. Creative teachers could teach all the basics and a whole lot more by teaching about garbage.

I. Teach a lesson about garbage and tie it in to other subjects.

See the Garbage ABC's for an example of tying a waste audit in to any subject matter.

II. Introduce waste management concepts in other lessons.

Teaching a lesson on Oregon Trail history? Have students explore what pioneers did with their garbage--or did they have any?

III. Use waste management examples to apply existing concepts.

Take math for example. Do your students ever get bored with the same old story problems about how many trips to the grocery store will it take to bring all the groceries home on a bicycle? Try one like how many garbage cans could be eliminated if the Jones family recycled all of their newspaper, milk jugs, tin cans and aluminum. In fact, let students write their own story problems based on weighing and measuring the materials they recycle at home.

Or perhaps you teach language arts. Let students practice their library research and writing skills on a topic related to solid waste--incineration for example.

IV. Use solid waste to talk about the environment.

Earth day is coming up. You don't have any lesson plans, but would like to be sure your students remember the importance of the environment to their quality (and maybe quantity) of life. Use solid waste reduction, recycling, disposal, landfilling, energy recovery as a hands-on topic to talk about environmental issues like air pollution, rainforest depletion, groundwater contamination, and natural resource depletion. How many times were solid waste issues involved in the 1993 forest summit? See how many students really understand

the relationship between putting paper in the recycling bin and saving trees.

V. Use solid waste as a central focus for current events discussions.

Have students watch local, regional and national news for stories related to solid waste management issues. Have them tally which topics appear most often. Compare the coverage in different papers on the same subject, or discuss the implications of certain media not covering a particular story. Contact the North American Association for Environmental Education (see **Section Five: The Resources**) about using their Environmental Issues Forum materials in your classroom. Although designed for adult community groups, The Solid Waste Mess: What Should We Do With The Garbage is a great collection of readings on this issue, and the leaders guide has some helpful group management tactics that would work with adaptation in a classroom.

VI. Be sure you teach appropriate life skills.

The goal is to make your students more capable of effective living in the community of the future. Teach appropriate skills including persuasion, consumerism, political action, legal action, ecomanagement/physical action. Start a Green Schools program or an environmental club.

Summary

Regardless of which entry approach you take, always be sure you guide students through all three steps of environmental learning: awareness of the problems; knowledge of alternative choices; and responsible action--what can we do here and now? Action can include an individual decisions/actions model, a community problem solving approach, or an issues analysis model (choose an issue, investigate/analyze the issue, define the problem, identify alternative actions, consider the consequences, assess your ability to make a difference, and do something.

Garbage ABCs

Is this teaching thinking skills, or what? Start, for example, with identifying and looking at the problem. Kids love to look at garbage. Try it. Take a big plastic tarp and dump the garbage can in the middle of your room. See how many subjects you can address using that pile of garbage. (This activity is variously known as a Trash Audit, a Garbage Inventory, a Lesson of Sorts, etc. It doesn't matter what you call it as much as that you DO IT!)

Anthropology?	What can we learn about this culture by looking through the garbage?
Biology?	What happens to organic food waste when it sits in a garbage can for a day. . . several days. . . weeks? How might that be different if it was buried in a plastic container and covered with dirt?
Chemistry?	What chemical compounds might we identify in this garbage? What chemical manipulations could be carried out with the garbage? What could students learn from running a few experiments?

Drama?	Have students do the play "The Throwaway Three", which dramatizes the way people have dealt with trash throughout history. Or let students do improvisational acting using the items in the garbage as props or subjects.
English?	Have students write Haiku or other poetry about the items in the garbage. Use information related to the garbage in a short story or as the setting for a novel. Write a research paper on any item in the garbage.
Finance?	How much did the materials in the garbage cost? Could they have been replaced by less expensive materials? Could a new product be produced utilizing the materials? Could a new business be created to deal with them? What percentage of the school's budget is represented by the items in the trash? How would eliminating the garbage affect the school's budget for other activities?
Geography?	How far has each item traveled in its life time? What effects does the local geography have on the composition of waste in the garbage can?
Home Economics?	Ask students to determine whether the items in the garbage were the best consumer choices possible. Compare energy costs and purchase costs of each item.
Industrial Arts?	What new products or packages could be produced from the items you found in the garbage? What construction skills would be necessary to landfill the material? What construction skills would be necessary to recycle the material?
Journalism?	Have students write a press release explaining what they found in the garbage and making recommendations about its disposal.
Korean?	What items in the garbage were manufactured in Korea? Which (if any) are made from natural resources of that country?
Literature?	Have students discover what notable literature used garbage as a setting, part of the character, or integral to the plot--or re-write a favorite story and set it in a garbage dump. How would the story need to be changed to make it authentic?
Mathematics?	Have students weigh and measure the garbage. Calculate volumes. Sort into various kinds of items and calculate percentages by type.
Natural Resources?	Which items in the garbage are still in their natural state? Which have been altered by human activity? Which came from renewable vs. non-renewable natural resources? What natural resource careers exist because of or could be developed related to the garbage?
Oregon History?	Where was the first commercial landfill in Oregon? When did Oregonians build the first garbage burner in the state?
Psychology?	Have students take a poll of students, teachers, staff, parents, and community members regarding the garbage problem and various solutions. Tabulate the results and prepare charts and graphs to present the information to decision-makers.
Quantum Physics?	What happens to garbage when it is compacted? What is the potential energy capacity of the garbage in your room?
Reading?	What reading materials appear in the trash? What books can students find in the library about trash? What pre-reading character is built on the idea of garbage?

Speech?	Have students take an issue related to garbage: reducing waste, disposing of waste, recycling materials, etc., and prepare a speech or debate about one side of the issue.
Technology?	How could various technologies be used to help solve the garbage problem? Have students invent a new system to reduce or dispose of waste using classroom technology.
U. S. History?	Develop a timeline related to garbage and waste for the United States. Find references to the first federal government policy related to solid waste issues.
Vocational Ag?	Which items in your classroom garbage could be used in a compost heap? Bring a worm bin into your classroom and let students feed it with appropriate organic wastes.
Writing?	Have students write essays on garbage: history, reducing waste, planning for future disposal, etc.
Xenogenesis?	Have students speculate beyond the Teenage Mutant Ninja Turtles to the possible genetic effects of leachate polluting drinking water sources.
Yachting?	What effects does the garbage disposed of in the ocean have on land-based life? Should there be stricter regulations and penalties for marine debris than other garbage? How could they be enforced?
Zoology?	Using materials that should go into the worm bin, have students study all the various life forms that contribute to successful "natural" recycling. Bring in a microscope and see if students can identify different components of the compost.

From A to Z, we've now helped our students pin down the source of the problem. Using your favorite problem-solving model, lead them in activities to generate alternative solutions.

Getting Dirty: Conducting a Garbage Audit

Before students can begin to understand the need for waste reduction and recycling, it is necessary first to understand the magnitude of the waste problem. The impact of a classroom waste audit is one of the most personal for students--sorting through the classroom trash brings the waste problem into immediate focus in a way no other activity can! A garbage audit will also help build students' awareness of their individual contributions to the waste management problem, and help them begin to assess possible contributions they could make to solving the problems of waste. Completing a garbage audit can provide the basis for discussion in many different subject areas, so the earlier in the year it is completed, the more work you can do with the results. In fact, the best plan is to do a garbage audit at least twice a year, so you can see whether your efforts are having an effect on the garbage.

If you do not feel comfortable doing a classroom waste audit on your own, call your county solid waste or recycling office, or your local waste hauler for technical assistance (see contact numbers in **Section Five: The Resources**). Some of these offices will even send someone out to help you with the audit. If they are going to come to the school, try to work with your school's recycling coordinator or committee to have a complete school building audit done at the same time. Use the results to help your school set goals for a school-wide waste reduction and recycling program.

Sometimes, it helps to present the facts before, during or after your waste audit. For example:

- Oregonians generate over 2.5 million tons of garbage annually
- Half or more of Oregon's garbage is produced in the Portland metropolitan area
- Oregonians produce enough garbage to fill the Memorial Coliseum in Portland 37 1/2 times in a year
- Each Oregonian produces 4 1/2 pounds of waste per day

Materials:

- large plastic or paper tarp
- rubber or plastic gloves for each student
- one or more waste containers filled with typical school garbage
- one large waste bag per student
- bathroom scale
- calculator
- clipboards, pencils, *Garbage Data Forms*, etc. for record keeping
- *"What's In Our Garbage?" Data* for comparisons (or call your district Resource Conservation Manager, building custodian, or county solid waste office to see whether your county has data about amount and cost of garbage for schools in your district)
- recycle bags, trash liners and empty garbage can for disposing of waste at the conclusion of your audit
- optional: white Tyvek sanitary suits (When students suit up for the job, they seem to get more excited about the activity!) They can be purchased for about $3.00 apiece through safety supply stores, but you can try to locate donated suits through your county solid waste office, from local businesses that use clean-room procedures, etc.

NOTE: Do not audit bathroom waste, as it may contain items that are health hazards. You may also want to use a cafeteria wastebasket to emphasize the total impact students have on the waste stream, but auditing wet garbage takes more technical assistance. If you plan to audit cafeteria waste, be sure you call on a county solid waste expert for help.

- Arrange in advance of your audit day so that the custodial crew will not take out the garbage you intend to audit.
- Begin by spreading the tarp on the floor and dumping the classroom wastebasket out in front of class. If you extend your audit beyond your own classroom waste, you may want to schedule the use of the gym or playground for your sorting area.
- Once the garbage is spread out in front of students, have students put on gloves and assist you in sorting the garbage. Separate the trash into as many categories as possible, including non-recyclable and recyclable, reusable, etc. Categories could include plastics, aluminum, returnable beverage containers, paper towels/tissues, school supplies, disposable items, broken but repairable items, packaging, containers, food wastes, etc.
- Complete the audit by weighing/measuring and filling out the *Garbage Data Form*, and disposing of the trash appropriately. Try to sort and weigh the recyclable items into separate piles as noted on the form. Be sure to record the results very carefully. You can use the form on the next page, or get the one from the school handbook Oregon Schools' Formula for Success in Waste Reduction for some comparison data.

- Have students make various comparisons of garbage, including what percent of the waste fits into various categories. How much waste is there per person per year, given a per person rate of 4.3 pounds per day (Oregon average)? How much garbage is produced in your school? In your town? In your county? In Oregon?

Make an even bigger impression on students by declaring the wastebasket off limits. Give each student a garbage bag, which will be that student's wastebasket for a week. Nothing should be thrown in other class or school wastebaskets, including those in the restroom, etc. Have a separate waterproof container for classroom food wastes, if applicable in your school. Have students audit their own garbage every few days.

Some students will want to conduct a home waste audit. If you decide to have them do this, be sure you send home instructions, data forms, and an explanation letter to parents.

What's In Our Garbage? Data

This data is also available in the Classroom Activity Packets, together with a master to make an overhead transparency of the garbage can. Use the transparency as a pre-test to determine how well students understand the issues related to waste management. Have students guess the percentage of the waste stream for each category before you fill it in. The figures refer to the weight of material disposed of in the municipal solid waste stream, and do not include weights of recycled materials or industrial waste. Call DEQ Solid Waste after October 1993 (503) 229-5913 or 1-800-452-4011 for the latest statewide recycling rates and final garbage figures. Call your local contacts (see **Section Five: The Resources**) for local data.

Material	United States*	Oregon*	Portland Metro*
Paper/Paperboard	32.3%	24-28%	30%
Food Waste	not listed	16-19%	7%
Plastics	9.5%	5-6%	9%
Yard Waste	19.0%	11-15%	11%
Metals	7.7%	6-8%	6%
Glass	6.5%	3-4%	2%
Textiles (see notes)	(in other)	3-6%	5%
Wood	(in other)	5-8%	12%
Other	16.6%	12-18%	17%

* Notes: U.S. Data from EPA, compiled by Franklin Associates, 1992, Municipal Solid Waste in the United States. Oregon data from DEQ Waste Composition Study, 1993. Portland Metropolitan Area data from Metro's 1989 Waste Composition Study. Metro is currently conducting a waste composition study, with updated figures scheduled to be available early in 1995. U.S. "Other" category includes wood, textiles, and miscellaneous organics and inorganics. Oregon's "Textiles" category includes disposable diapers.

Garbage Data Form

Recyclables	#Items	Weight	Volume	% wt	% vol
White Paper					
Colored Paper					
Computer Paper					
Newsprint					
Cardboard					
Glass Containers					
Aluminum					
Metals					
Food Waste					
Hazardous Waste					
Yard Waste					
Milk/Drink Boxes/Bottles					
Construction/Shop Debris					
Scrap Metal					
Recyclable Plastics (by #)					
Lunch Trays					

Recyclables Continued	#Items	Weight	Volume	% wt	% vol
Scrap Paper/Magazines					
Miscellaneous (List)					

Non-Recyclables	#Items	Weight	Volume	% wt	% vol
Other Plastics					
Other Paper					
Trash					
Hazardous Waste					
Miscellaneous (List)					

Notes

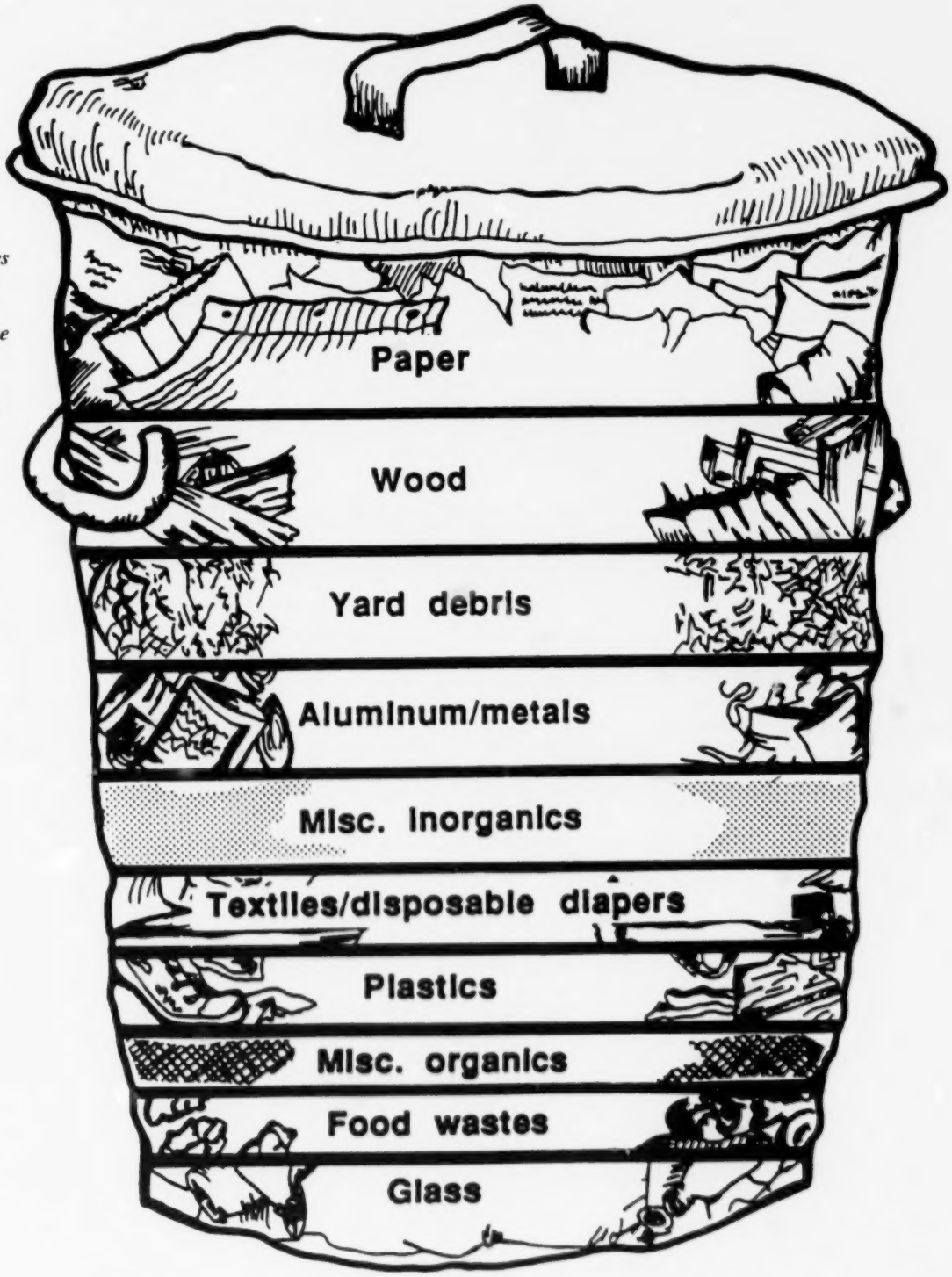
Total Volume of Garbage Sorted _____ Total Weight of Garbage Sorted _____

Total Volume of Recyclables _____ Total Volume of Non-Recyclables _____
Total Weight of Recyclables _____ Total Weight of Non-Recyclables _____
% of Initial Volume _____ % of Initial Weight _____
% of Initial Weight _____ % of Initial Volume _____

What's In Our Garbage?

For the figures from the latest Oregon Department of Environmental Quality Waste Composition Study, call DEQ at (503) 229-6709 or 1 (800) 452-4011, or the Oregon Environmental Education Network at 1 (800) 322-3326.

The "paper" category includes everything from newspaper, cardboard, office and computer paper to magazines, junk mail, and packaging.



How can we empty the can before it's landfilled?

School Recycling Programs:

How to Use the Oregon Schools' Formula for Success in Waste Reduction

Have you ever heard to refrains "school is boring"? "classes are irrelevant"? "what difference will it make in the real world"? Through explicit statements or subtle behaviors, students, parents and even educators have often communicated the message that a subject or topic studied in school is dry, stale, out-of-date, or unimportant. The way to make waste reduction (and, in fact, any topic related to the environment) relevant to students is to give them hands-on experience with the topic in a real-world setting. The way to make waste reduction education hands-on and real-world is to have an active, effective waste reduction and recycling program in place and operating in your school. Students will then be able to practice what they are learning, see how the concepts of waste reduction can contribute to a lower school operating cost, and try out personal actions that can later be used in their own homes.

The Oregon Schools' Formula for Success in Waste Reduction was designed to guide schools in a step-by-step process through assessing an individual building's waste habits, setting goals and establishing a program to reduce waste, reuse materials and recycle as much as possible. The handbook includes an introduction to the whys and hows of waste reduction and recycling; suggestions on specific ways to reduce the amount of waste generated in schools; ideas on how to reuse school materials; suggestions on getting staff and students to participate in the school's program; guidelines to setting up a school waste reduction and recycling program appropriate to the local market; and resources (including forms) to help organize the program. The handbook also includes some examples of programs other schools have used and suggestions on setting up a recognition system to reward participation.

A lot of the information on how to prepare materials or ideas for programs can be used in individual classrooms even if your school program isn't yet underway. In fact, many schools indicate that it is the efforts of individual classroom teachers that sparked their school-wide recycling program. If your school has not yet started a program, take a copy of the Formula to the next faculty meeting, student government meeting, board meeting, PTA meeting--wherever there are people who are concerned about the environment enough to put their energy behind the program. Don't do it all yourself, but talk to other members of your school community until you get a group together with enough commitment to make things happen.

Always remember that your local waste hauler, recycling center, and county solid waste office are critical players in a successful school program, as is the person or office responsible for purchasing policies. Don't try to do it without them! Also remember this valuable advice from Margaret Mead:

- *Never doubt that a small group of committed citizens can change the world. Indeed, it's the only thing that ever has.*

You don't need to change the world--just get a hands-on learning lab started in your school: a waste reduction and recycling program!

Taking Advantage of Technology

One of the biggest reasons schools are making changes is to accommodate the rapid pace of change in our world. Perhaps the most rapid change is occurring in the technology available to transmit information and assist in the process of teaching and learning.

Computers

Many schools already have computer centers, or even computers in individual classrooms throughout the school. The Oregon Department of Education received a grant from the U.S. Department of Education which will allow elementary and secondary students and staff to connect to Internet, an international computer network. This connection will not only link schools to each other, but to local, state and federal agencies who can provide schools with up-to-the-minute data and information. Internet includes access to the Library of Congress, NASA, many universities, and technology companies worldwide. The system is called the Oregon Public Education Network (OPEN), and is expected to be operational in the fall of 1993. These computer connections will give new meaning to "real-world" education: what better way to study your environment than to tap into the daily air quality index readings, weather predictions, fish and wildlife counts. The potential for this on-line statewide network is incredible! (See **Section 5: The Resources** for other computer ideas.)

Educational Television

Another contribution to the technology explosion is the use of educational television, including regular broadcasts through the public broadcasting system and teleconference broadcasts through the Oregon EdNet system. If your school isn't already a member of the Oregon Public Broadcasting system, encourage them to contact Oregon Public Broadcasting Educational Services, 7140 SW Macadam Avenue, Portland, Oregon 97219-3099, or call (503) 293-1984. This service publishes a newsletter every month of the school year to keep teachers posted about upcoming broadcasts that might be utilized in the classroom. OPB's recent separation from state government has not changed its level of service to schools. In fact, in the September 1993 issue of *Signal* (their education community newsletter), OPB indicated that they are adding K-12 teachers in member schools to the mailing list for the newsletter so teachers will have ready access to information about instructional TV services, broadcast schedules, etc. Each issue of the newsletter will highlight both prime-time and classroom-time broadcasts that may be of interest, as well as information on inservice broadcasts especially for teachers. Of special interest to teachers using Rethinking Recycling will be the broadcasts of such series as The Race to Save the Planet and the 3-2-1 Contact Extras that cover solid and hazardous waste issues.

Library Resources

Many libraries are beginning to offer expanded information systems, including connections to on-line data base searches and complete catalogs of information on CD-ROM. If your school or local library has invested in new technology, make sure your students are the first to research issues related to the environment using these new tools. If they haven't, you might spearhead an effort to raise funds to add these new technologies to your school library--or your own classroom!

Using Simulations and Games

Simulations and games have been valuable tools in schools for many years. The Classroom Activity Packets for grades 6-8 and 9-12 include simulation activities, while the lower grade level Packets include games in various lessons. Beyond following the directions and playing the game, the best use of simulations and games is to involve students in designing the game, establishing the rules and methods for play, and establishing a way to determine the "winner" or deciding the outcome of the simulation. The problem-solving and creativity skills involved in game design and play are two of the most important skills employers are looking for in future employees. It may be hard to believe, but the more fun they have, the more students are likely to learn from simulations and games!

Concentration/Memory Game

Have students locate pictures of disposable items and their recyclable or reusable alternatives. Attach the pictures to index cards and place face down. Have students match items and alternatives. Be prepared to discuss with students the pros and cons of each item and alternative, as well as recycling options in your community. You could also point out the choices even children are able to make when they shop. (If you can't find pictures, have students draw pictures and/or write the names of items instead). Students should be encouraged to add to the game whenever possible.

Ideas for matches:

- glass ketchup jar/ plastic ketchup jar
- glass juice bottle/paperboard frozen juice can
- disposable diapers/cloth diapers
- plastic milk jug/waxed paper milk carton
- paper towel/cloth dishtowel
- paper plates/china dishes
- ballpoint pen/fountain pen
- Kraft paper bag/plastic bag
- metal swing set/molded plastic swing set/wooden swing set

Concentration/Memory Game II

Using a set of cards you have made up of the following pairs, have students match the raw and/or recyclable material with the finished product. You can use this to discuss the process of recycling.

Ideas for matches:

- office paper/scratch pads
- glass soda pop bottle/glass soda pop bottle
- plastic soda pop bottles/fiberfill/carpet backing
- grass clippings/soil made from compost
- trees/newspaper
- sand/glass jar
- tires/railroad crossing ties
- newspaper/gray cereal boxes
- plastic milk jug/molded flower pots or molded plastic play equipment

Jeopardy

Together with students, devise questions and answers about waste reduction. List these on separate pieces of paper and divide into categories. "Contestants" must ask the right question when the answer is drawn.

Ideas for questions and answers:

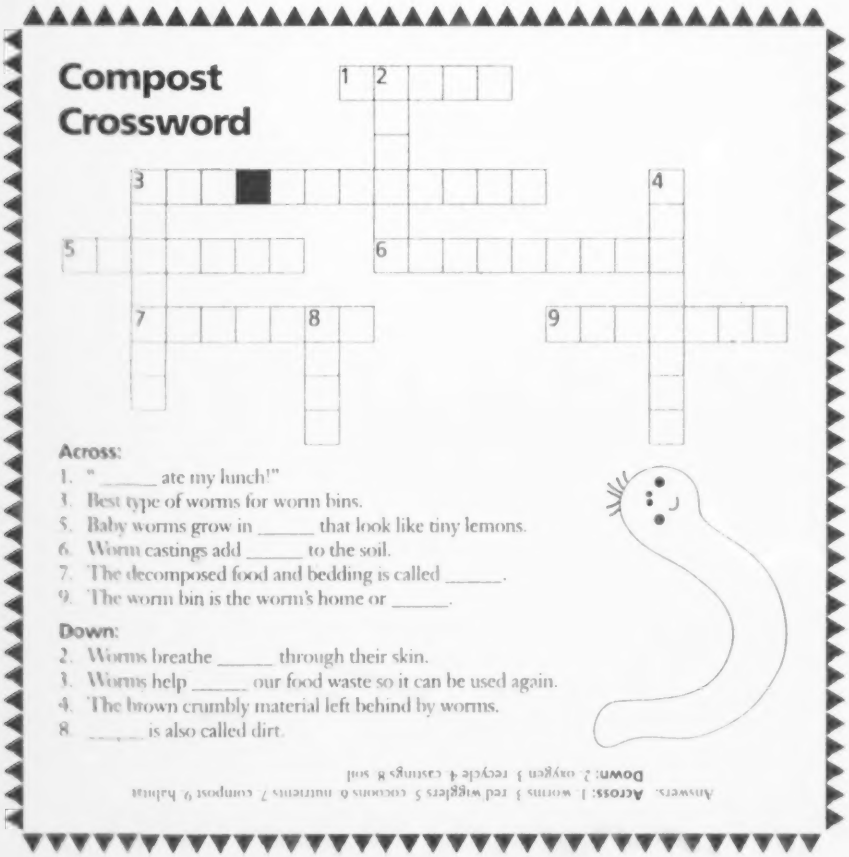
- Under the litter category, the answer could be "found along roadsides". The question would be "what is litter?"
- Under the Bottle Bill category, the answer could be "at the supermarket". The question would be "where do we recycle soda pop cans?"
- For older students, the answer could be "ninety-five percent". The question would be "what percentage of cans and bottles were being returned within one year of the passage of the Bottle Bill?"

Wheel of Fortune

Have students spell out vocabulary words or phrases which are related to recycling using the format of the "Wheel of Fortune" TV game show.

Bingo

Rather than numbers, make up cards using words which relate to recycling.


Compost Crossword
Across:
1. "_____ ate my lunch!"
3. Best type of worms for worm bins.
5. Baby worms grow in _____ that look like tiny lemons.
6. Worm castings add _____ to the soil.
7. The decomposed food and bedding is called _____.
9. The worm bin is the worm's home or _____.
Down:
2. Worms breathe _____ through their skin.
3. Worms help _____ our food waste so it can be used again.
4. The brown crumbly material left behind by worms.
8. _____ is also called dirt.
Answers: Across: 1. worms 3. red wigglers 5. cocoons 6. nutrients 7. compost 9. habitat
Down: 2. oxygen 3. recycle 4. castings 8. soil

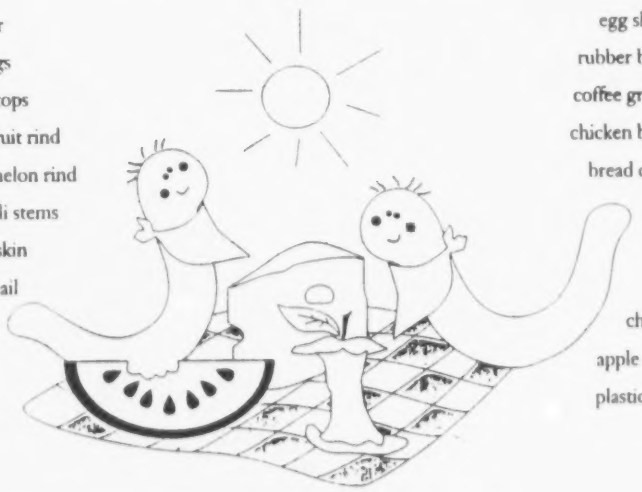
What's for Lunch?

or... trashy recipes for worms

Here are some things we often throw in our trash cans.
Circle the items that can be fed to the worms in our bins instead!

lettuce
glass jar
hot dogs
carrot tops
grapefruit rind
watermelon rind
broccoli stems
onion skin
junk mail

tin can
egg shells
rubber band
coffee grinds
chicken bone
bread crust



cheese
apple core
plastic bag

Answers: lettuce, carrot tops, grapefruit rind, watermelon rind, broccoli stems, onion skin, egg shells, coffee grinds, bread crust, apple core

Worm Bin Delight

a yummy dessert for kids

Top layer:
Crush 1 bag of chocolate cream filled cookies with rolling pin

Middle layer:
Whip together:
- 3 1/2 cups of milk
- 2 sm. pkg. vanilla or chocolate pudding mix
- Fold in 10 oz. whipped topping

Bottom layer:
Candy worms

Layer ingredients in clean plastic flower pot ending with cookies on top.

Chill.

Decorate with plastic flowers and more candy worms. Eat and enjoy!
(option: do individual desserts in small clean flower pots or cups)

METRO

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Help! Some very valuable things are on their way to the landfill! Save them from being thrown away! Circle in blue the things which can be recycled. Circle in green the things which can be reused. Some may be both!

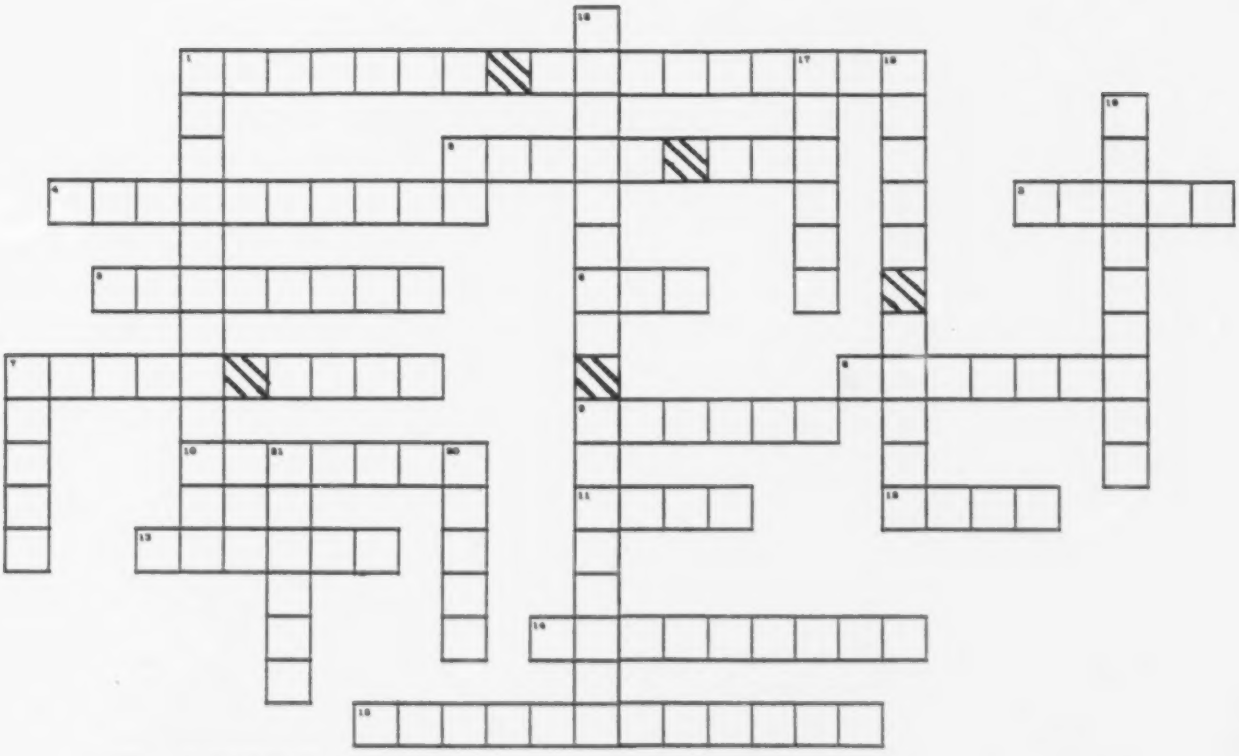
S	A	V	E	Y	A	R	E	D	U	C	E	L	M	N	O	P
V	W	X	Y	Z	L	R	E	P	A	P	X	K	N	A	L	B
G	H	I	T	B	U	T	E	N	I	R	A	G	R	A	M	J
F	T	X	I	P	M	I	L	K	X	J	U	G	S	Q	R	S
L	P	E	N	C	I	L	S	O	L	D	X	T	O	Y	S	K
U	N	E	X	V	N	R	E	U	S	E	I	C	X	M	D	X
N	I	T	C	M	U	S	A	V	E	C	R	A	Y	O	N	S
C	E	B	A	C	M	A	B	C	X	N	Q	R	S	T	U	R
H	A	W	N	U	X	P	Q	B	R	O	M	D	R	O	R	E
X	R	R	S	Z	P	Y	A	R	E	L	X	B	L	R	A	C
B	T	E	L	P	L	G	M	U	D	I	B	O	X	X	B	Y
A	X	U	Z	J	A	R	S	S	U	T	O	A	K	O	R	C
G	P	S	K	R	T	P	K	H	C	T	T	R	D	I	J	L
S	A	E	L	M	E	P	E	R	E	E	T	D	M	L	K	E
O	P	X	Y	Z	S	O	P	R	Q	R	L	D	O	N	T	M
R	E	C	Y	C	L	E	B	C	S	P	E	W	A	S	T	E
G	R	O	C	E	R	Y	X	B	A	G	S	X	E	K	O	J

Did you find:

- newspaper
- cardboard
- bottles
- milk jugs
- old toys
- brush
- tin cans
- jars
- grocery bags
- margarine tub
- box
- motor oil
- plastic bags
- crayons
- pencils
- blank paper
- art paper
- aluminum plates

(P.S. There are some extra bonus words hidden here, too! Can you find them? What do they tell you?)

RECYCLING CROSSWORD PUZZLE



ACROSS

1. Recycling saves _____ _____
2. _____ ____ is recycled into fuel.
3. Plastics _____ decompose.
4. Brown paper bags can be mixed in with _____ cardboard for recycling.
5. ____ _____ should be rinsed, flattened, and have the paper labels removed for recycling.
6. Recycling reduces ____ pollution.
7. We _____ _____ 99% of the plastics we buy.
8. Aluminum comes from the mineral_____ .
9. Plastics _____be recycled into food containers.
10. _____ and jars can be recycled.
11. Reducing, reusing and recycling solid waste will help save our _____from landfills.
12. Curbside recycling is _____
13. We must _____ the amount of trash we produce.
14. Trees are a _____ natural resource.
15. _____ in plastics hamper the recycling process.

DOWN

1. Oil and metals are _____ natural resources.
7. Each Oregonian throws away 1600 pounds of _____ every year.
16. Portland metropolitan area landfills enough trash to fill the _____ _____ every month.
17. Crushed glass prepared for recycling is called _____.
18. Another name for trash and garbage is _____ _____.
19. It takes _____ trees to make one ton of paper.
20. A "tin" can is mostly _____ and can be recycled.
21. Recycling _____ will pick up recyclable materials monthly at curbside.

The Oregon Green Schools Network: A Vision of the Future

The need for a statewide network of schools involved in environmental acitvities surfaced after the Department of Environmental Quality surveyed users of its original RE:THINKING RECYCLING curriculum in the summer of 1992. Responses to a survey that was distributed to recipients of the curriculum statewide indicated a need for a support system for teachers to help them effectively teach the concepts involved in the waste management curriculum. Key components of the requested system included

- a support network that provides local contact (including a newsletter to share ideas and successes, local support groups, in-building training and technical assistance, a lending library, information clearinghouse, and an information hotline)
- assistance establishing and operating a building-level recycling or waste reduction program
- teacher inservice training
- more support from recycling organizations, waste and recycling haulers, community members, businesses, local and state government, and school constituents (administrators, parents and students)
- additional information and in-building resources about the content areas involved

In reviewing curricula available from other states, DEQ discovered that the curricula that were most used and had the greatest record of success were those in which the hands-on materials were only one element in a support network that included on-site inservice training and technical assistance, an information clearinghouse, and a newsletter or other method of correspondence (including on-line electronic bulletin boards) with teachers and students statewide.

As a result, DEQ will turn its efforts in 1993-94 to orchestrating the connections that will allow students and schools anywhere in the state find the assistance they need to set and achieve goals related to natural resources and the environment. The Oregon Green Schools Network will assist schools in their efforts to

- assess their impact on the environment
- set goals and strategic plans for minimizing that impact
- implement projects selected to meet the needs of the individual school
- solicit assistance from local, state and federal natural resource agencies and organizations in accomplishing the goals

The Oregon Green Schools Network will be an umbrella program designed to connect schools, businesses and government agencies concerned about natural resources and environment. It will outline steps to help schools audit their energy use and other environmental issues that may be appropriate at individual schools. For example, if a school audit shows a wildlife habitat adjacent to the school grounds, or an endangered wetlands on its own property, the Green Schools Network will connect the students, teachers, parents, staff, and administration with existing resources that can help them take positive steps to protect, conserve, or maximize the use of the natural resources and environment unique to that school. **Watch for future announcements about the Green Schools Network!**

Working With Parents, Community and Classroom Volunteers

One of the side-effects of the economic crisis in Oregon has been an increased recognition that if schools are going to accomplish what they need to with our students, they will have to depend on more volunteers and donations than ever before. Oregon has a long history of volunteerism in the schools. Now is the time to take action on all those good intentions to organize a classroom volunteer program at your school. The sources for volunteers has expanded since the days of PTA Room Mothers. Volunteers now come from among parents, grandparents, older brothers and sisters, employees of local business and industry, members of civic and community groups, high school and college student organizations. . . the list seems almost endless.

Starting a volunteer program just takes a little thinking on your part.

Step 1: Decide what volunteers could do to help.

Make a list of specific activities that could be done in different categories.

- Classroom Volunteers--these volunteers would actually be in the classroom while students are there, assisting with classroom activities, grading papers, demonstrating a skill, craft or talent, teaching a mini-lesson
- School Building Volunteers--again, these people would be in the building, but in the library, media center, on the playground, running a book sale, etc.
- Field Trip Volunteers--these volunteers would assist you as you take students on field trips, and might accompany you from the classroom or might meet you at the field trip site to assist
- Other Volunteers--these volunteers take on tasks that could be done anywhere on a volunteer-selected time schedule, like preparing an information directory, compiling a mailing list, making phone calls to plan an activity, or entering information into a computer database

Step 2: Prepare a volunteer information packet.

Each task you identify that could be done by volunteers needs to be described, including how much time is involved and when that time would need to be available; what kind of qualifications the volunteer would need to do the task (patience is high on the list for any classroom volunteers!); equipment or materials that would need to be used by the volunteer; training or supervision available or necessary; how to sign up, etc.

Step 3: Advertise your need for volunteers.

Identify sources of potential volunteers in your community. Do not overlook

- organized volunteer programs like RSVP (Retired Seniors Volunteer Program), or (in the Portland metro area or Marion county) the Master Recyclers Program
- church, civic and community groups
- local employers--some allow employees to take time from work to volunteer in the schools, others make donations of equipment, materials or money when they can't spare employee time
- relatives and friends of students in your school

- educational programs--a lot of college-students are looking for internships or work-experience opportunities that they will fill on a volunteer basis

Advertise in as many ways as you can--school and organization newsletters, flyers on bulletin boards, announcements through group meetings, notes sent home with students, a telephone tree to parents--and don't be afraid to ask for public service announcement time on the radio!

Step 4: Plan and conduct training for your volunteers.

You don't always have to do the training yourself, but everybody likes to know the ropes before they get started. You can even do "training" in the form of a flyer you hand or send to volunteers ahead of time, or a phone call that clearly communicates the what, where, when, why and how you're expecting from the volunteer. If your school has a formalized volunteer program that involves signing in at the office and recording time, be sure you include information on that expectation in your training. Always have volunteers show up a few minutes early even when they've had training, so that you can communicate any last-minute instructions or schedule changes.

Step 5: Recognize and/or reward your volunteers for all their hard work.

Many schools have formal school-wide volunteer programs that include an awards banquet and certificates for volunteers. If your school doesn't have a program in place, volunteers even appreciate hand-made thank-you notes from your students after an activity. Keep track of any hours spent by your volunteers, even if it is for child-care so that another parent can accompany your class on a field-trip. A lot of potential funding sources look at total number of volunteer hours as a good measure of how well your school is doing.

The most important rule of thumb for a good volunteer program? Do it now!

"If you don't get started in the next seventy-two hours, you ain't going to get started at all."
Colleague of Tom Peters from A Passion for Excellence

Recognizing Involvement and Success

Everyone enjoys being recognized for the things they do, and students, staff, parents, and others are more likely to participate in waste reduction, recycling and other environmental preservation activities if they get positive feedback for doing so. Here are just a few ideas for recognizing success to get you started--others will come as you brainstorm your program.

- In a prominent place, keep track of the amount of recyclables collected. Show visually how it is increasing. Relate that amount to resources saved.
  (For example, since 118 pounds of paper are made from one southeastern pine tree and 3 barrels of oil, students recycling 236 pounds of paper each week are saving 2 trees and 6 barrels of oil.)
- Institute a monthly traveling award that is presented to the classroom with best record of waste reduction for the month.
- Select the "top recyclers" from each classroom and provide a field trip for them to a recycling company or a scholarship to the Association of Oregon Recyclers (AOR) spring Youth Summit.

- Contact recognition programs at the state or national level. Each year AOR and DEQ recognize an outstanding young recycler with the Steele Gale Martin recycling award, and in 1993, they began to jointly recognize schools in the Waste Reduction Awards Program (WRAP Awards--see application form). School recycling programs are also eligible to apply for The President's Environmental Youth Awards through the EPA. Students K-12 can apply as individuals or as a class.

Award Winning Ideas from Oregon Schools

Steele Gale Martin Achievement Award

In 1991, a 7th grade class from Dayton Junior/Senior High School won the AOR Steele Gale Martin Recycling Achievement Award for successfully siting and setting up a full service recycling depot for the city of Dayton. With the help of their local hauler, City Sanitary, the students were involved in every aspect of planning and implementing the recycling program. They went to the City Council for permission to site the depot on school property, developed brochures and education materials (which they translated into Spanish to meet the needs of their community), and arranged for a formal dedication of the depot by the Mayor. They made contacts with the media and local businesses, put an insert into residential telephone bills about the depot, and maintained the service by recruiting volunteer groups to help keep it clean. The students were rewarded by a visit to their school by Phil Kiesling (then Oregon Secretary of State), who made the award presentation.

In 1992, Douglas Orwick, a 6-year-old from Heppner Elementary School, won the Steele Gale Martin Award for starting a paper recycling program at his school. He investigated buying recycled paper and the process of recycling paper, then made a presentation to the faculty and recruited 25 teachers to start a pilot project. Douglas also trained other first graders to help with sorting, and often takes recess time to work on the recycling program.

1993's Steele Gale Martin Award was shared by two Washington County schools, Farmington View Elementary in Hillsboro and Learning Workshop Elementary in Forest Grove. Farmington View's 600 students and Learning Workshop's 38 are models of what kids can do when they get motivated. Both involve everyone in their recycling programs, from students, parents, teachers and staff, to local community members. Students at Farmington View have done public service announcements about recycling, and purchased rain forest property with the proceeds of their recycling program. 90 percent of the school's families recycle at home. Learning Workshop has the lowest rate of waste created per student for all the schools in Washington county. The school reuses buttons, keys and bread tags to teach counting and sorting, print daily schedules on the back of previously used paper, and rent a building instead of building a new one.

Waste Reduction Awards Program (WRAP Awards)

The 1993 Elementary School WRAP award was given to McBride Elementary School in St. Helens for an overall waste reduction of 40 percent school-wide. The school has set a new goal of 50 percent for the 1993-94 year. The school recycles papers, cans, glass, lunchroom food scraps, milk cartons and drink boxes. The school's 18 classrooms produce an average of one bag of trash per day.

The first Secondary School WRAP award went to Newport Middle School's Earth Issues Class, a 7th grade group taught by Doug Robinson. The class coordinates the school recycling program, but also has developed and presented plays about recycling and training for younger students on how to utilize the city's curbside recycling program. The class spurred the school to change from disposable utensils to permanenet service ware in the cafeteria, and make scratch pads from used paper. Old corrugated cardboard boxes and empty five-gallon buckets are reused for cleaning and recycling activities.

"Excellence in Recycling" Grants Awarded to Schools

The Weyerhaeuser Company Foundation awarded four $2,500 "Excellence in Recycling" grants to Oregon schools in 1992. The grants were awarded to Cook Elementary School in McMinnville, Farmington View Elementary School in Hillsboro, and Gilham Elementary and Kennedy Middle Schools in Eugene. The contest is administered by the Oregon Department of Education, and recognizes schools for innovative recycling programs. First awarded in 1990, the grants represent Weyerhaeuser's commitment to increasing public understanding of the relationship between society's needs and the interests of the forest products industry. One of the state's largest users of recycled paper products, Weyerhaeuser processes newsprint and corrugated cardboard in its North Bend and Springfield facilities to make boxes in its Portland plant.

Commenting on the winning programs, State School Superintendent Norma Paulus said "Students understand the importance of protecting the environment, and they realize they have the power to make a difference. Recycling has become second nature to Oregon students. They don't just talk about it. They do it."

Cook Elementary's program was the first school-wide recycling program in the district. Started from scratch by second grade teacher Donn Callaham, it includes training teams, kid-sized recycling carts, posters, and flags. Second graders are this school's recycling experts.

Farmington View's Recycling Club members have been planning the school's weekly recycling work schedule for three years. Advisors Mary Hofmeister, Bobbie Rodriquez, and Patti Higgins work with students during their free time. The group encourages students and staff to recycle paper products and cans. Over 90 percent of students recycle at home!

Gilham Elementary recycles paper, paper products, milk cartons and plastic utensils. Computer paper is donated by local businesses as well. The program has generated over 1,000 pounds of recyclables per month since its beginning in 1991. Other activities included a student challenge, parent skit, posters and theme song, which resulted in an increased volume to 2,000 pounds per month.

Kennedy Middle School has a six-year history of recycling paper and cardboard, and has expanded to include milk cartons, lunch sacks, tin and aluminum cans, and plastic utensils. Field trips to local waste facilities and a cafeteria recycling center increased recycling and reduced the volume of garbage from eight sacks to two sacks per day in the lunchroom alone. Savings are estimated at almost $1,500 per year.

Weyerhaeuser awards information from Oregon First, Oregon Department of Education, (503) 378-3573.

AOR/DEQ Oregon Schools Waste Reduction Awards Program

The Department of Environmental Quality is charged with spearheading efforts to accomplish Oregon's waste stream reduction goal of 50 percent by the year 2000, and with providing educational and promotional programs and technical assistance to ensure that citizens understand and participate in efforts to meet this goal. The Association of Oregon Recyclers is committed to encouraging waste reduction and recycling efforts statewide. An organization of individuals, organizations, businesses and government agencies working together, it has a long history of effective involvement in education and promotion of recycling and waste reduction programs. The AOR/DEQ joint school/student awards program was developed to help each organization further their respective missions by recognizing outstanding efforts by schools and by individual students to reduce the waste problem in Oregon. The program presents three awards each year.

Award Categories

- **Elementary School WRAP Award** - for a public or private Oregon elementary school with an outstanding waste reduction program
- **Secondary School WRAP Award** - for a public or private Oregon middle or high school with an outstanding waste reduction program
- **Steele Gale Martin Achievement Award** - for an individual student or group of students who has/have made a significant contribution to waste reduction and recycling efforts in the State of Oregon. The nominee must be an individual or group under the age of 18 or be a high school senior at the time of the recycling activity and be an Oregon resident.

Awards Program Nominations/Applications

- Individual students and schools can be nominated by an AOR member, state or local government or interested businesses and their employees, or they can apply on their own behalf.
- Applications and/or nominations are due February 15 and are reviewed in the spring each year by an AOR/DEQ joint committee. Winners are announced at AOR's Spring Education Conference.
- Applications/ominations should be supported by data, news clippings, fact sheets, flyers etc. (The Oregon Schools Waste Reduction Program Survey form can be submitted as supporting material.) The more complete the supporting documentation, the easier it is to select winners.

Selection Criteria: WRAP School Awards

Points will be awarded to schools for reducing the waste stream by:

- **Reducing the amount of waste produced** in offices, classrooms, cafeterias and landscapes.
- **Reusing previously used materials/switching from disposable to re-usable equipment/materials**.
- **Recycling materials used** in the school.
- **Educating students about waste issues in daily classroom programs**.

Selection Criteria: Steele Gale Martin Achievement Award

Individual students or student groups are recognized for going beyond the call of duty when it comes to waste reduction and recycling. Student criteria will include:

- Outstanding personal commitment to waste reduction activities.
- Personal action effecting change in school/community (institutional) waste reduction actions.
- Individual action that motivates peers/community members (individuals) to reduce waste.
- Efforts to educate others (individuals, groups or institutions) about the importance of waste reduction and recycling.

AOR/DEQ Schools Awards Program Nomination/Application Form

Submit your choices of schools, individuals or groups of students who are deserving of recognition by AOR/DEQ. Send a brief statement supporting each of the nominees, describing why you believe each one is deserving of this special recognition. **Supporting materials** are encouraged -- news clippings, fact sheets, flyers, program data, statements by those impacted by the nominees activities -- and **may be a determining factor in the selection**. Anyone can apply or nominate schools or individual students for the awards. If you have any questions about the awards, please call DEQ (503 229-6709 or 1-800-452-4011 in Oregon outside Portland) or AOR (503 255-5087). Return this completed form together with any supplementary materials **no later than February 15** to AOR/DEQ School Awards, c/o AOR P.O. Box 15279, Portland, OR 97215. Thanks for your interest in improving Oregon's environment!

If you are nominating someone besides yourself, please list your name/phone here:_____

Elementary School WRAP Award

A public or private Oregon elementary school with an outstanding waste reduction program

Nominee/Applicant:_____

List two individuals or organizations that are familiar with the nominee's waste reduction efforts:

Name_____ **Name**_____

Address_____ Address_____

City/Zip/Phone_____ City/Zip/Phone_____

Briefly describe the activity for which this school is being nominated:

Secondary School WRAP Award

A public or private Oregon middle or high school with an outstanding waste reduction program

Nominee/Applicant:_____

List two individuals or organizations that are familiar with the nominee's waste reduction efforts:

Name_____ **Name**_____

Address_____ Address_____

City/Zip/Phone_____ City/Zip/Phone_____

Briefly describe the activity for which this school is being nominated:

Steele Gale Martin Achievement Award

An individual student or group of students who has (have) made a significant contribution to waste reduction and recycling efforts in Oregon. The nominee must be an individual or group under the age of 18 or a high school senior at the time of the activity and be a resident of the State of Oregon.

Nominee/Applicant:_____

List two individuals or organizations that are familiar with the nominee's waste reduction efforts:

Name_____ **Name**_____

Address_____ Address_____

City/Zip/Phone_____ City/Zip/Phone_____

Briefly describe the activity for which this student/group is being nominated:

the ideas

Section Four: The Ideas

- Oregon Recycling Awareness Week: History and Suggested Activities
- Oldies but Goodies: Activities Appropriate at all Grade Levels
- Developing a Classroom Resource Center
  - Ordering Sample Recycled Products/Recycled Products Directories
  - Free or Inexpensive Classroom Materials
- Plays and Songs

Oregon Recycling Awareness Week

This statewide special event began in 1986 to kick off implementation of the 1983 Recycling Opportunity Act. The Act provided curbside residential recycling opportunities in cities over 4,000 population as well as drop-off depots at all Oregon disposal sites and/or more convenient locations in smaller towns and rural areas.

To show how the opportunity to recycle had become available to Oregonians, then-Governor Victor Atiyeh took his materials to the curb in front of his Salem home--and also in front of newspaper and television reporters and camera people. Oregon industries ran newspaper ads, haulers distributed flyers to customers, and teachers attended workshops to learn about recycling. Subsequent annual events have been planned around a statewide theme (see list below), and are introduced by a proclamation by the Governor declaring the official Oregon Recycling Awareness Week.

In 1992, DEQ started the first of what it hopes to make an annual event, the Recycling Awareness Week Student Art Contest. This contest provides students from K-12 an opportunity to contribute posters, graphics, theme or slogan ideas and other forms of art work to support recycling. (The 1992 contest winners' art work has been used to illustrate parts of the Rethinking Recycling curriculum.) Information about the art contest is distributed as a press release to schools statewide prior to the October event.

Recycling Awareness Week is always held the first full week in October, and spans two Saturdays to allow lots of outside of school/work time for local community special events. Since this also encompasses the statewide teacher inservice day scheduled for Friday that week, many teachers have the opportunity to attend specially planned RAW-week inservice training activities. Contact your county solid waste office (contact information is in section 5 of this resource guide under "Local Resources") to find out what activities are being planned in your community/county to support recycling awareness.

Work with the Recycling Coordinator at your school to help plan events designed specifically for your students, faculty, staff and families. Many communities have their Mayor develop a proclamation for local Recycling Awareness Week--perhaps you should have your principal proclaim this observance for your school! Some suggested activities are listed on the following pages, and additional ideas are distributed each year to help you relate your classroom activities to the current year's theme. Themes can be modified to make them more meaningful locally (e.g. The State of Oregon--Recycling), and the statewide theme does not have to be used for your local activities. In fact, a contest among students to establish a school theme might be just the trick to get your students really involved. DEQ's Education and Promotion Handbook Getting the Word Out lists a number of general ideas for Recycling Awareness Week activities, including holding contests, sposoring public meetings, soliciting recycling pledges, and developing and displaying posters as appropriate local activities. Let your students help you decide what Recycling Awareness Week activities can make your school and/or local community recycling effort better. The more students get involved, the more they will learn about the what, who, where, when, why and how of Recycling!

The themes of recycling awareness weeks past include:

- 1993: The State of Oregon Recycling
- 1992: Recycling: Part of the Whole Picture
- 1991: Recycle Oregon
- 1990: Be a Winner: Recycle
- 1989: Recycling: It's the Oregon Way
- 1988: Oregonians Recycle
- 1987: Recycling Saves
- 1986: Kick-off year, no statewide theme.

Recycling Awareness Week School Project Ideas

★ Work with your local government recycling coordinator to do a school-community joint activity (see "Activity Suggestions for Recycling Awareness Week" available from DEQ).

★ If your school's recycling program isn't already in place, there's no time like the present! See the handbook Oregon Schools Formula for Success in Waste Reduction, and contact your local government recycling coordinator for technical assistance. Invite your parent-teacher organization to become involved.

★ Use this week to implement the Rethinking Recycling curriculum activities: a lesson a day keeps the garbage away! (Don't have a copy? Call DEQ!)

★ Plan a waste audit by classroom or by building. If you already have a recycling program in place, compare this year's audit with one done before you started recycling--see how effective your program really is! Try a lunch-room garbage audit daily, graph it, compare differences. (Again, ask your local government recycling coordinator for help!)

★ Hold a school-wide Recycling Olympics (aka Enviro-lympics, Garbage Games, Recycling Rodeo), with events like the milk-jug shuffle (attach milk jugs to your feet and see who can run while they smash the jug), trash-ball (fill two 32 gallon cans with dry trash, dump on each side of volleyball court--object is to get all the trash to the other side (NIMBY), tin-can stilt races, can opening relay and bin-throw, sort the trash relay, trash-toss (like the hammer throw, but pick recyclable items that aren't potentially dangerous like an empty milk-jug, paper sorting bag, etc.) (Joan Grimm, Washington County)

★ Schedule a recycle art contest and put the winning creations in a calendar, poster, advertisements or other format to remind students, teachers and staff to recycle. Don't just limit your students to two-dimensional pictures of recycling themes--encourage them to create art with recycled materials and include categories for soft sculpture, new uses for old stuff, etc. Enter school winners in DEQ's statewide recycling art contest.

★ Everybody loves the movies. Recruit a theatre arts or video production class to make a recycling video for your school. This could be an MTV-style music video, a documentary, a sci-fi look at the future of recycling, a horror "what if we don't recycle" flick, or "home movies" of the recycling projects in staff and students' homes.

★ Read recycling announcements every morning--choose inspirational, informational, or humorous environmental announcements including "did you know" facts, quotes from famous environmental protectors, or ideas for students or classes to make their recycling program even more effective.

★ Have teachers or students write songs, poems, stories or plays about recycling and environmental issues and publish an Environmental Literature magazine. Sell it to parents to raise $$$ for your recycling program.

★ Dedicate a corner of your school to a Recycling Museum (Garbage Gallery, Waste

Wroom) that includes history, technology, current trends, even interactive exhibits like a trash-sorting station that provides on-the-spot feedback about recycling skills.

★ Show recycling movies in the auditorium during lunch each day--pick favorites like 3-2-1 Contact's Rotten Truth and Yakkety Yak Take It Back or moldy oldies like Recycling Waste into Wealth. Advertise them in a way that will draw the crowd and serve popcorn and soda in recycled containers (e.g. empty cottage cheese cartons and yogurt cups). Finish off by a marathon clean-up session to see how fast the movie watchers can recycle the leftovers.

★ Let students write and dub their own radio (TV?) Public Service Announcements--play them on your morning recycling announcements and send them out to the local media. Teach students about the importance of the media in shaping people's behavior.

★ Try a Recycle Market--let everyone set up booths and sell/barter recycled items. Let the Home Ec department do a food booth with recycled snacks ("Leftover" Pizza, Homemade ice cream with "leftover" fruit flavoring, sourdough bread items, etc.); the art department can have a heyday with recycled art (see item above), craft booths can sell recycled jewelry, a clothing booth could feature recycled jeans or patchwork skirts--this list could go on and on, but let your classroom teachers and their students take off with this idea. Let the FFA sell compost-grown fruits and vegetables and invite your local hauler or recycling groups to set up booths as well.

★ Hold a recycling awareness parade. Let students dress up as recycle characters. Include a band of instruments made from recycled materials. March through the halls at school, or go big-time and arrange with your community to make it a street parade. (Work with your local government's solid waste department to get all the permits--they may even want to make it a city or county-wide event and invite recycling floats from businesses.)

★ Have each classroom in your school design and produce their own recycling game and hold a school fair where students win badges (recycle stickers?) for winning. Ideas include board games, trivia games, TV game-show type games (Concentration, Jeopardy, Wheel of Fortune, etc.), fair games (trash-dunk booth?).

★ Find (or write) your own Top 40 Recycling Hits and hold a Recycled Sock Hop. Have everybody bring those leftover socks with no mates (clean, please), put them in a bin, and to get into the dance they have to pick a pair to wear. Serve recycled food treats (popsicles made from pureed fruit, punch made from leftover juices/soda, banana bread, etc.) Play hits from the best recycling videos, or invite the Garbage Gurus (call Pete DuBois, Portland Public Schools) or another premiere recycling music band to play. Let students dress in recycled sock hop appropriate clothing, and give awards for the best outfits, best recycled dance steps, etc. Try karaoke for the best recycled music ever!

★ Recycle all those election-year political buttons. Use the Recycle Button original in the curriculum (or have students design their own button) and decopauge a used button.

★ Recycle previous years' Recycling Awareness Week activities. Go through the files of teacher or school-sponsored activities and find one that hasn't been done for awhile. These kids are all new! Better yet, let the student council help you plan activities!

Activities for All Grades

- Parade. Organize a school or class recycling parade. Students might dress up as recyclable newspapers, cardboard, tin cans, aluminum and glass.
- Reuse Day. Have students wear clothing handed down from someone else and bring

in materials which have been reused instead of being thrown away.

- Field Trips. Take your class to a local landfill, recycling center, energy recovery plant, glass manufacturing plant, paper mill, beverage bottling company, etc.
- Science Fair Projects. Adapt science activities from the Classroom Activity Packets and enter them in a Science Fair.
- Logo/Slogan Contest. Have students design their own logo or slogan about recycling.
- Plays, Skits. Have the class perform existing plays or write their own.
- Recycling Relays. Set up relays to practice preparing materials for recycling and solving recycling problems.
- Musical Instruments. Have students use materials from the trash to make musical instruments and use these for the parade or music activity.
- Posters. Have a recycling poster design contest. Solicit help from local recycling representatives, grocery stores and business. Offer a prize for the best poster and display posters in your community. Send the winners to DEQ's statewide contest.
- Music. Have students compose a song about garbage, landfills, recycling or reducing waste. Perform it for the school or parent-teacher organization.
- Recycling Fair. Hold a fair with booths explaining how to sort, prepare and store recyclables. Don't forget to include booths that promote changing buying habits and producing less waste. Arrange to use the booth at a community event.

Making Paper

- Electric blender or egg beater
- window screen to fit the frame
- 3" deep pan, larger than screen
- Blotting paper or newspaper
- Paper towels and sponges
- Picture frame, approximately 5" x 7"
- thumb tacks or staple gun to attach screen to frame
- Large spoon
- Iron
- Scrap paper--the more colorful the scrap, the more colorful the recycled paper will be

Process

- Begin by making the paper frame. Tack the piece of screen to the picture frame. The paper will be made on the screen.
- Tear paper into strips and loosely pack in blender until 1/3 full. Add water until blender is 2/3 full
- Blend for 3 to 5 seconds. Add colored paper at this stage until you get the shade you like. Blend again. (For texture, add thread, dried spices, leaves, etc.)
- When the mixture looks like mush, pour into pan and add an inch of water. Stir.
- Hold the frame screen side up and spoon the mixture evenly onto the screen. Let the excess water drip off.
- Place a piece of blotting paper on top of the mixture and flip the whole screen over, blotting paper down.
- With paper towels or sponges, blot up the moisture which seeps through the screen, especially at the edges.
- Carefully lift off the frame and cover the new paper with more blotting paper, making a blotter "sandwich". Iron both sides using the "wool" setting.
- When the blotters seem to be dry, peel off the blotters. If they can't be peeled easily, the paper isn't dry enough.
- Iron the paper to dry it out completely. Use the paper you made yourself!

MAKING GLASS

Glass is made by heating sand, lime and soda until the mixture melts. After it cools, it is poured into molds and injected with air.

The following activity simulates the making of glass, substituting sugar for sand. By participating in this activity, students will gain an understanding of the heat and energy required to melt and make the glass mixture, and of the process involved in glass manufacturing.

Materials:

1 cup sugar
Electric frying pan or hot plate and pan
Sheet of glass
1/4 cup water

Heat the water. When it boils pour in the sugar. Stir this mixture vigorously over heat until the sugar is dissolved, about 5 minutes.

Carefully pour the mixture onto the sheet of glass. Allow to cool, about 15 minutes. Then hold up the two sheets of glass so students can see through them. By allowing it to set overnight, the glass will become frosted.

MOLDING GLASS

All bottles and jars were once made by glass blowers who blew bubbles with the molten glass mixture and formed them into shapes which hardened as they cooled. Manufactured bottles and jars are formed by injecting air into the molten glass mixture in a mold. Help your students understand how glass is molded by having them participate in the following activity.

Materials:

Stiff straw or glass tubing
Balloon
Wide-mouthed jar
Rubber band to hold the balloon to the straw

Fix the balloon onto the end of the tube or straw with the rubber band. Put the balloon into the jar and ask students to blow up the balloon to fill the jar, which acts as a mold.

Building a Mini-Landfill Model

Have students study pictures of modern landfills using the materials in the Classroom Activity Packets or your school library. Either assign students to work as groups, or give the whole class an assignment to work together to construct a landfill for your classroom.

- Use a sturdy cardboard box as the landfill. Cut away one side of the box for observation.
- Put a plastic or clay liner in the bottom of the box to prevent leakage of water from the bottom of the box.
- Put in a glass plate or clear plastic film in the cut down side to allow students to view the experiment.
- Fill the landfill with sand or wood chips. (Sand may be too heavy for the cardboard box to be carried).
- Place a clear glass bowl against the cutdown side of the box for easy viewing, then bury it in the bottom of the landfill and mound the sand up on the sides of the cardboard box.
- Pour clean water in the bowl until the bowl is about half full.
- Bury sheets of aluminum foil in the sand on two sides of the bowl. The foil beneath the surface should slope down toward the edge of the bowl, making a channel. The edge of the foil should be just over the lip of the bowl, but kept at as low a degree of visibility as possible.
- Take two strips of paper or paper towels--saturate one with red food coloring and the other with blue food coloring. Then place the paper on top of the submerged layers of foil in the landfill. (Refer to drawing next page). The pieces of paper represent landfills and the food coloring represents leachate.
- Regularly observe the clear water in the shallow bowl to determine if and when it becomes "contaminated" by the food dye from either of the two "landfill" layers.
- Add "rain" in the form of drops of water, to the two dye-soaked pieces of paper in the model "landfill". Record any changes in the migration of "leachate".

An alternative is to actually bury various items of waste in layers in the landfill, covering with sand each time. Although this will take longer, students will be able to observe the actual process of decomposition as (or if) it takes place. Discuss the life of various kinds of waste in a modern landfill.

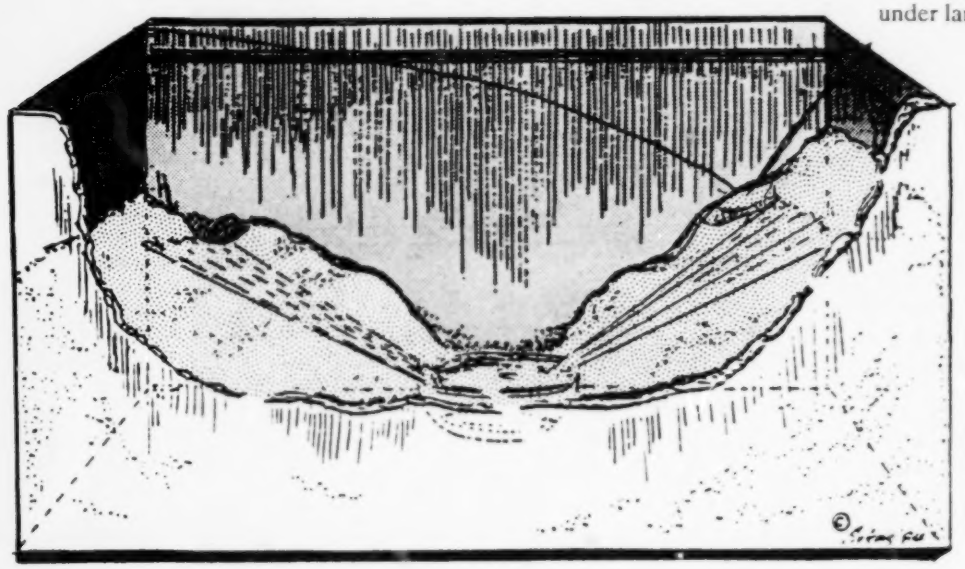
This Mini-Landfill Model activity was adapted with permission from A-Way With Waste, a 1990 publication of the Washington Department of Ecology.

A Model: Rainfall, Landfills, and Ground Water Pollution

LANDFILL
filled with strips of paper
soaked in red food coloring

LANDFILL
filled with strips of paper
soaked in blue food coloring

LINER of modeling clay
under landfill



Fill with SAND

Trough of foil leading *into*
bowl *buried* in sand

SHALLOW BOWL or SAUCER
partially filled with *clear* water
(sunken below sand)

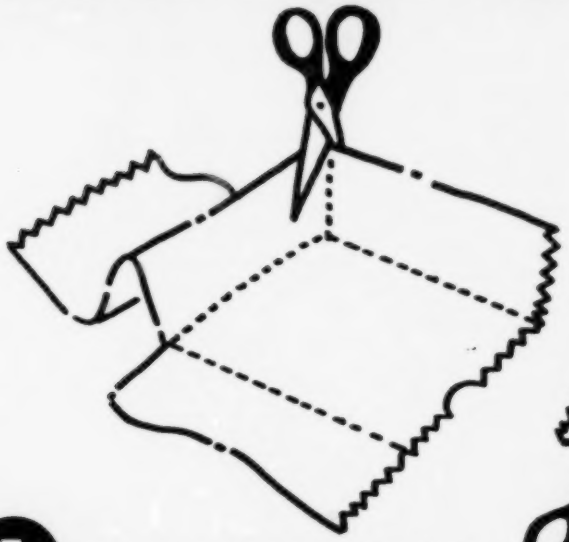
Cut away front of box
to show display

Materials

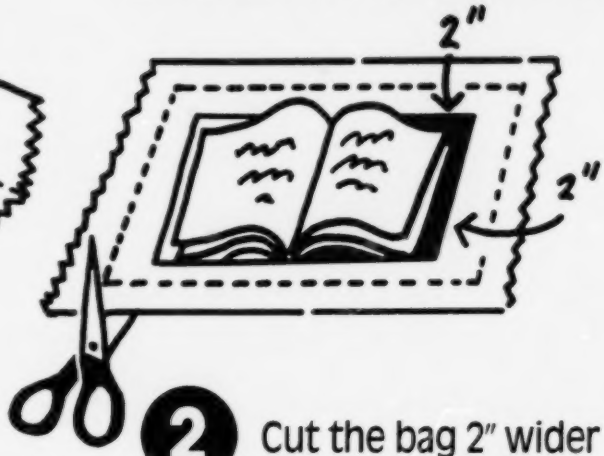
- Corrugated cardboard box
- Strips of paper
- Aluminum foil
- Shallow bowl or saucer
- Red and blue food coloring
- Sand (available at many garden supply stores) or wood chips
- Clay (modeling clay or actual soil)

By finding NEW uses for paper bags and other materials, you help save trees and protect the environment.

Make Your Own Brown Bag Book Cover!

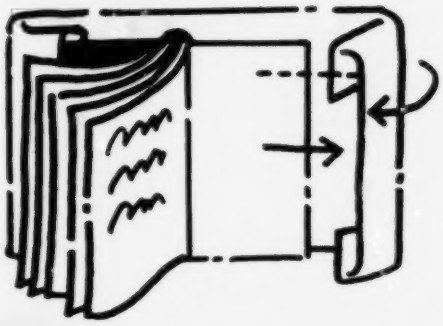


1 Cut open bag to lay flat.



2 Cut the bag 2" wider than your book.

3 Fold paper to size of book.



4 Slip book cover into folded ends.

Developing a Classroom Resource Center

The bibliography in **Section Five: The Resources** lists organizations involved in recycling, waste management, and related fields. Many of them offer free or inexpensive articles, catalogs, or classroom materials that can be valuable for your use. In addition, check the following resources for classroom ideas and materials

- many of the county recycling contacts in Section Five have materials available on loan to classrooms.
- DEQ has a list of Oregon recycling markets that can be obtained by calling DEQ Solid Waste (503-229-5913 or 1-800-452-4011 inside Oregon, outside Portland). This list tells you which recycling organizations accept which products statewide, as well as which ones may give customers money for their materials.
- Recycled Products Directories--many manufacturers of recycled products have samples of recycled materials available for use in your classroom. Recycled products directories are available from
  - Oregon Department of General Services, (503) 378-4644
  - Metro Recycling Hotline, (503) 234-3000
- The Daily Recycler, and the Recycling Wheel. Quick reference wheels that help identify typical discarded items, options for reducing, resuing, or recycling, current information on the state of recycling for that product (national data), and % of the waste stream. Available from Environmental Hazards Management Institute, 10 Nemarket Road. P.O. Box 932, Durham, NH 03824. To Order or for information, call 1-800-446-5256. Often provided through a sponsoring groups like waste haulers.
- Clearing Magazine is a helpful classroom resource that includes articles and information about a variety of environmental education topics, as well as a place to order popular materials. Use the order form below or join the Environmental Education Association of Oregon (1-800-322-3326), which uses Clearing as its official newsletter. The March/April 1993 issue of Clearing focused on waste reduction and recycling education. With permission of Clearing, we have reprinted the "Green Pages" activity section of that issue as a sample of what is available in this publication.

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THE GREEN PAGES

Environmental Education Activities K-12: RECYCLING

COMPILED BY KITTITAS COUNTY SOLID WASTE

TEACHERS and CURRICULUM WRITERS!

Here is your opportunity to help share your knowledge of environmental education activities and get paid for it at the same time! CLEARING Magazine has presented activity ideas in The Green Pages for the past three years. We would now like to share the responsibilities for developing this section with teachers or other environmental educators in the Pacific Northwest. We will offer $50 per issue to the individual who can provide us with a collection of K-12 activity ideas in the format of The Green Pages for future issues of CLEARING. If you are interested in this opportunity, please call or write to CLEARING at 19600 S. Molalla Ave., Oregon City OR 97045; (503) 656-0155.

The activities in this issue of The Green Pages were compiled by Kittitas County Solid Waste Department. Special thanks go to Lonnda Anderson for contributing her time and energy to this effort.

The activities in The Green Pages are intended to give you ideas to build on in your classroom. They have been kept simple to allow you to adapt them for your particular classroom needs. They have been divided by class level and subject matter to enable you to more easily integrate them into your existing curriculum.

GRADES K-2

Science

Landfill Lesson

Establish a mini-landfill model by using an aquarium or other glass enclosed container. Fill bottom with two to three inches of soil. Bury various garbage items that students frequently use such as writing paper, plastic candy wrappers, milk cartons, aluminum cans, organics from their lunches, etc. Have students predict the length of time it will take for each item to begin to decompose. Predict which item will last the longest, which will change the most in form, color, etc.

Garbage Gardens

Have students bring in an egg carton and empty halved egg shells from six eggs. Pierce the bottom of the egg shells and fill them with composted soil. Place the egg shells in the egg carton to keep upright. Plant various types of seeds in the egg shells. Make sure to label each student's egg carton with their names and types of seeds they planted. Extend the learning by creating experiments dealing with the effects of natural environmental variations such as light and water as well as "artificial" variations including the application of household hazardous wastes found in the classroom (check out areas around your sink for these products!)

Social Studies

Toy Swap/Garage Sale

Hold a classroom toy swap or garage sale with items students bring from home that they no longer use or want. This event might be held prior to Christmas or other holidays with a focus on swapping the items for use as gifts for others.

Mathematics

Paper Problems

Provide the class with a predetermined amount of paper to be used for that day's activities. On the following day, request suggestions from the students to reduce the amount of paper used for the same activities. Each day strive for and note the reduction of paper usage. Have students chart the reductions on the chalkboard.

Language Arts

Trashy Thoughts

Have each child share their thoughts about the word "garbage." List their responses on the chalkboard and categorize them as either positive or negative. After exploring and discussing the recyclability and potential reuse of items from the classroom trash, ask the students for any additional thoughts about "garbage." Add these to the positive or negative listings on the chalkboard. Follow with a discussion of how you can turn garbage into "more" by making it "less."

Building a Book

The teacher will start a story by presenting a context and character focusing on a solid waste issue. For example: "Once there was a landfill named Stinky who didn't want to grow..." Each student, in turn, creates part of the story by building upon the previous student's storyline. When the story is complete, the teacher can put it into a booklet format which the students then individually illustrate.

Fine Arts

Hats from Trash

Collect items which would normally go immediately into the waste stream such as paper scraps from local printers, stickers from delicatessens (use instead of tape), packing peanuts, etc. Create headbands from used poster board and size to each student. Have students build creative and imaginative hats from the scraps. No-waste prizes such as pizzas, ice cream cones, etc. can be awarded for various categories. Students can exhibit their hats in school and/or community displays.

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Musical Instruments
Have the students create musical instruments from reusable trash items. Have a musical production using the instruments as accompaniment or as Earth Day parade noisemakers.

GRADES 3-5

Science

Oil, Oil, Oil
Determine the effects of improperly disposed of motor oil in our environment by having students observe oil spills out in the parking lots, in puddles or streams which illuminate the concept that oil and water don't mix. Conduct classroom experiments on living plants using controls watered with plain water and study groups watered with oil contaminated water. Discuss the importance of proper disposal of oil, where it is collected locally, and where you can buy re-refined oil in your area.

Social Studies

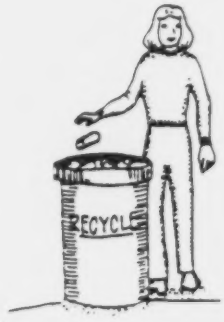
Garbage Sleuths
At least two participating classrooms request the custodial staff to hold the trash from their individual classrooms for one week without the students' awareness. At the end of the week, the students analyze the amount and types of trash generated by the other classroom. Following discussions and activities about waste reduction and recycling, each class makes recommendations for waste reduction and presents them to the other class.

Where, Oh Where
Take a familiar object to the students like a pencil, bicycle, rollerblades, etc. and research where each component of that product comes from. Discuss the environmental impact that they have as consumers and the importance of reuse/recycling and buying recycled.

Mathematics

Milk Carton Madness
In an attempt to determine how much potential space milk cartons take up in a landfill, students measure and calculate the volume of one milk carton. Students also determine the volume of their classroom. Using the milk carton volume figures, have the students determine how many cartons it would take to fill up the classroom. Then determine how many milk cartons are generated by the entire school in one day. Determine how long it would take to fill up their classroom. Extend these computations to a volume the size of the school. Follow this by discussing the importance of diversion of materials from the landfill and by exploring the feasibility of milk carton recycling at your school.

Betcha Can't
Divide students into several teams. Have each student from each team bring in a clean item from their home trash. Using their imaginations and creativity, the team members work together to determine at least one or more ways in which each of their items could be reused. Write down and keep score of how many reuses are determined. Give the same items to another team for a "Betcha Can't Find As Many Ways to Reuse These Items Challenge." Continue playing until each team has been challenged by each of the other teams. The team that has the highest reuse score wins.



Language Arts

Myth Making
After an investigation of sample myths and legends, have groups of students construct myths conveying a waste reduction lesson. An example might be "How the Garbage Dump Disappeared."

Word Games
To build waste reduction literacy, card games can be developed in which waste reduction terms such as "post consumer waste," "reuse," and "compost" are matched with their definitions. Word searches, crossword puzzles, and dot-to-dot activities can be developed to enhance this vocabulary building.

Fine Arts

Milk Carton Monsters
Rinse the milk cartons from lunch. Half way down the length of each carton, cut through three of the sides. Fold the cartons in half forming a hand-manipulated puppet. Spray paint (optional) puppet base and decorate with scraps of paper, yarn, and other reuse accessories.

Table Tents
Provide students with cut sheets of recycled paper that will be folded into triangular tent shaped form. Have students print and illustrate an environmental message on the tents. Place the tents throughout the school and community in libraries, cafeterias, offices, waiting rooms, etc.

Sidewalk Chalk
Request that each child bring in a cottage cheese container, a toilet paper tube, a used piece of aluminum foil, and a used rubber band. Seal off one end of the toilet paper tube by forming the aluminum foil around one end and securing it with the rubber band. Have each child individually mix Fix-All or Plaster of Paris, water and powdered tempra paint in their cottage cheese container to the consistency of "heavy soup" or "chocolate pudding." Pour the mixture into the secured toilet paper tube and wait until it begins to harden. Immediately upon hardening (10-15 min. maximum), tear away the paper tube to reveal "sidewalk chalk." The next day, use the chalk to draw environmental ideas or messages on the sidewalks outside of your school.

GRADES 6-8

Science

Alternative Lifestyle
Set up activities through which students explore the results of using products containing potentially hazardous materials with alternative products without the hazardous components. An example would be the use of baking soda to

(continued on page 16)

clean sinks versus the use of a cleanser containing chlorine bleach. (Lists of "alternatives" can be obtained through local solid waste departments). Have students record their observations. After discussing the possible "trade offs" of using the alternatives, have them make recommendations for incorporating their use to the school administration and to their parents.

Going Organic

Have students research the use of "organic" methods to enhance plant growth and control pests and disease. Using either indoor or outdoor test plots, raise two groups of easy growing flowers or vegetables using the organic versus chemical-based methods. Determine a series of variables to observe and measure (such as germination rate, plant size, growth rate, vigor, disease problems, etc.) regarding the two methods. Compare the results and discuss the pros and cons of organic versus chemical-based gardening. Extend the activity by designing and implementing an organic school or community-based garden.

Social Studies

Recycling Around the World

Explore how people in other countries deal with waste reduction and recycling. Individuals or groups could research various countries and report on their findings. Information might be obtained by writing to the tourism committees, chambers of commerce, consulates or similar groups from other countries or by investigating trade journals that deal with waste reduction and recycling. Follow with a discussion about how the waste reduction activities or approaches might be adopted by the United States or Canada or in the students' homes or community.

Secondhand Garb

Schedule a day when all students wear at least one secondhand clothing item to school. These could be "hand-me-downs" or items purchased from secondhand stores. Have students explore (through individual writing or group discussions) their feelings and thoughts about wearing secondhand items and discuss what they feel to be positive or negative aspects of doing so. Have willing students challenge

others to identify which items of their clothing are reused or present a fashion show to the entire school.

Celebrate Your Environment

Plan an entire "Enviro Week" leading up to Earth Day. Each classroom designs an activity for that week which promotes environmental awareness through posters, banners, and other school media outlets and provides specific individual, classroom, and school-wide waste reduction/recycling activities. Example projects might include turning a classroom into the inside of a "garbage can," having displays about food and container wastes in the cafeteria, or hosting a "Reduce, Recycling, Reuse" fair for parents and the community.

Resource Exchange

Organize a resource exchange in your school. Have classroom and office "throw a-way" collected in a centralized location for possible use by someone else. Extend this activity into the community by contacting businesses and organizations to match resource "wastes" with resource "needs."

Mathematics

Running on Empty

Obtain information regarding the energy units saved by recycling aluminum cans, the amount of aluminum cans recycled by your community in one month, and the amount of energy it takes to run the school for one month. Calculate how long the school could run on the energy savings of one month's worth of the community's aluminum can recycling efforts.

101 Ways

Have one classroom challenge another to see which can be the first to find 101 ways to reduce/reuse/recycling in their school. Teachers will keep the running lists. When the goal of 101 ways has been reached, have the two classes work together to share their ideas by making large charts of the "ways" to hang in the hallways.

Language Arts

Speaking Out

After participating in a waste reduction activity such as a community litter patrol, provide students with names and addresses of newspaper editors, governmental officials, organizations, and agencies associated with waste reduction policies, issues, and endeavors. Students can write and send letters expressing their opinions, concerns, and suggestions for improvement.

Script Writing

Students can write scripts for dramatic or musical productions focusing on waste reduction or reuse/recycle themes using characters they develop such as "Dougy Fir" or "Tinny Can." They can perform the plays or musicals for children at lower grade levels or videotape the works for sharing with other schools, parents, and the community.

Jeopardy Challenge

Divide the class into teams. Each team designs a set of "Jeopardy" categories and answers focusing on waste reduction, recycling and buying recycled. The teams meet each other in a "Jeopardy" challenge.

Fine Arts

It's All in the Game

As individuals or teams, create board or card games out of reusable/recyclable materials. Focus the games on waste reduction themes. Have the students share their games with other students.

Recycle Rap

Hold a "rap" writing contest focused on waste reduction themes. Students then perform their songs wearing costumes made from reusable materials or items.

Party On!

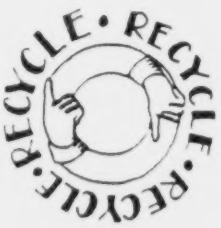
Plan a party or dance with a reduce/reuse/recycle theme. Students must wear secondhand clothing, decorate with reused materials, serve refreshments in/on recyclable or reusable containers, and follow-up by recycling the party decorations. Offer prizes in various categories such as "the totally radest secondhand outfit," or "the best use of recyclables for decorations or advertising poster."

GRADES 9-12

Science

Get the Big Picture

Observe the dynamic interrelationships within a worm bin. Perform case study



experiments in smaller environments such as five gallon buckets. Split the class into equal groups and have each group modify one element such as water availability, over population, bedding content, pH increases due to food modifications or increases in worm castings, etc. and document the results. Compile findings and relate the results of the environmental modifications to the class. Compare and contrast a closed system worm bin ecosystem to earth ecosystems.

Social Studies

Change

Research occurrences of change in previous history. Define the elements of long-term and short-term change. Plan a strategy based upon your findings which creates a positive environmental change in your school. Examples might include: Increasing the amount of recycled products utilized by your school district or individual students; decreasing the amounts or types of household hazardous wastes used by the school, etc.

Design a City

Students collaborate to design a city where all waste products are reused or recycled. Let creativity and imagination flow; focus not on what is practical but what is desirable. Individuals or small groups can take responsibility for various aspects or systems of the city. Present the final product to the whole school or display at local recycling centers.

Mathematics

Waste Audit

Conduct a waste survey or representative classrooms/offices within your school for the entire week. Determine waste categories, weights, and volumes. By extrapolating this data, determine effective waste reduction and recycling potentials for the school. Provide the school administration with the results of your findings in a spreadsheet format along with some simple suggestions for cost saving changes.

Keep a Good Thing Going

Determine by weight of the materials collected, how much your school recycles. Then with your school's "procurement officer," determine which of your school supplies have recycled content in them. Using these amounts (weigh a representative product) and content percentages, determine how much of your school's recycling effort were "bought back." Convey this information to your school's administration and student body. Remember, you're not *really* recycling until you *buy* recycled!

Language Arts

Make the News

Invite a news reporter from your local newspaper to your class as a guest speaker. Have the reporter outline the basic steps for conveying information via a newspaper format as well as some experiential helpful hints for effective article writing. Then have your class write newspaper articles regarding local/regional solid waste issues. Submit quality final drafts to the local newspaper, school newspaper, school district newsletter and/or Clearing Magazine.

Conveying the Message

Provide students with detailed information regarding the use of graphics and language to convey powerful messages. Have the students collect existing environmental advertising and critique its effectiveness. Then create posters, fliers, newspaper advertisements, etc. regarding waste reduction/recycling/buy recycled which employ the elements of effective advertising. Remember to stress the continuance of the waste reduction theme by reusing scrap paper for sketches of layout designs, the reverse sides of previous posters ("posters with a past life"), etc. Seek out multiple ways to display the messages.

"The Good/The Bad/The Wasted"

Instruct students to create and produce videotapes on waste reduction themes to be shown in other classrooms, schools, or at home.

Powerful PSA's

Invite an advertising agent from a local radio or TV station as a guest speaker in your classroom. Review the components of effective ways to convey a message in a short amount of time. Have the students write public service announcements on the importance of "Buying Recycled" to air on local radio and TV stations. Set up a visit to a local studio to record the personalized advertisements.

Poet's Corner

Sponsor a school-wide poetry contest on waste reduction or recycling themes. A variety of categories such as" humor, haiku, dramatic, etc. could be offered. The poems of the winners can be published in the school newspaper and/or printed in booklet for which the students could share with their families. Arrange to display them throughout the school and community for additional exposure and impact.

It's Your Trash: Face It!

Instruct students to utilize their photojournalism expertise to tell home, school, or community "trash" stories in photographic portfolios or displays. For example, students might follow the flow of the waste stream from the classroom trash can to the landfill site, or take photos of a variety of trash containers within their community.

It's Not Funny, But It Could Be...

What makes a cartoon interesting, funny, informative? Have students collect a diverse selection of comic strips/cartoons and discuss the methods being used to convey the message. Then instruct the students to generate comic strips or cartoons which feature a solid waste theme or specific concern. Highlight these efforts in school newspapers, newsletters, or bulletin boards.

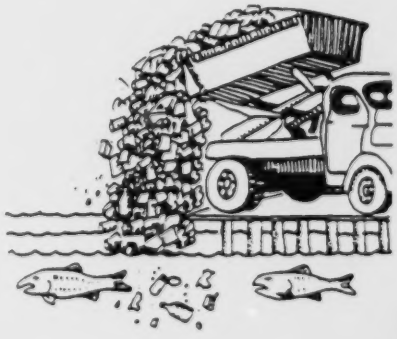
Larger Than Life

Create murals depicting the local journey of various "trash items" from their manufacture or production to their ultimate discarding. Include possible recycling/reusing/buying recycled options. Hang the mural(s) in the classroom or school hallway.

Art

The Power of Art

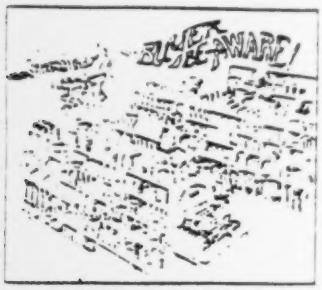
Present the works of environmental artists. Reveal the styles and language they used to convey their powerful environmental images and messages. Have the students create their own which conveys some call to action or feeling about solid waste issues.



Graphics from Connections: A Curriculum in Appropriate Technology for 5th and 6th Grades, NCAT, 1980

Recycling Posters

These full-color posters are available in limited quantities from The Recycling Pact, P.O. Box 1391, Medford, OR 97501. The school price is $24 for the complete set of seven. Call Jeanne LaGrand (503) 779-8039 at the Recycling Pact for individual prices and availability information. They are printed on recycled paper.



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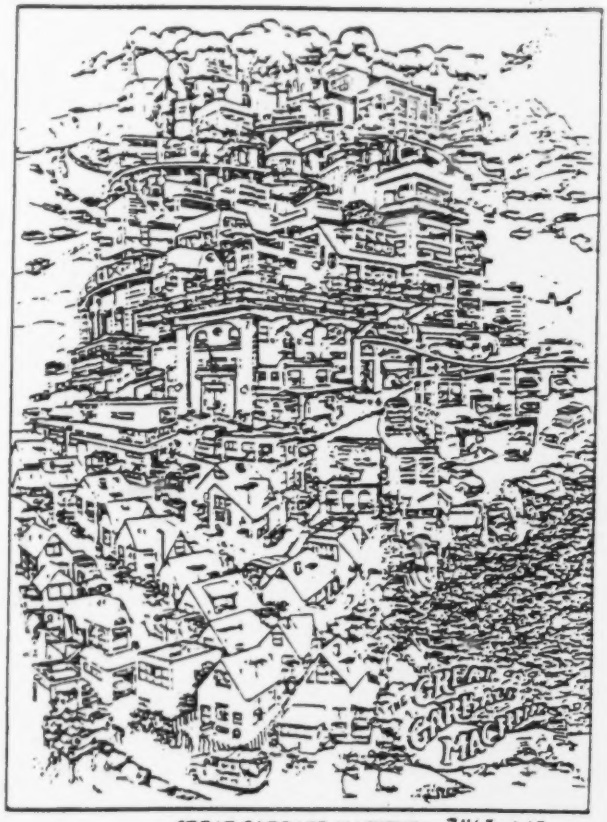
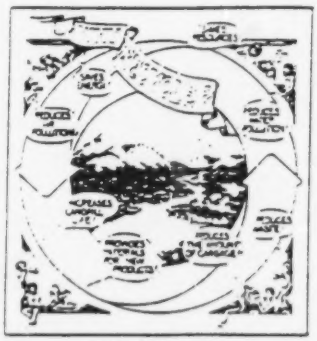
TECHNOLOGY!
24½"x28"



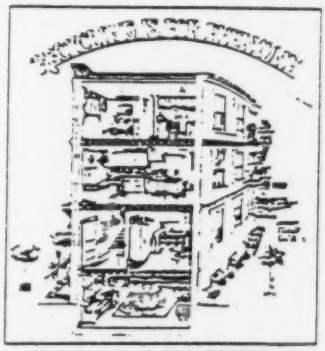
GREAT GARBAGE MACHINE! 31½"x44"

"These posters could stop a bulldozer!" Tom McCall, Oregon Governor 1967-74

"We are mounting the posters and putting them up on Main Street. I think you have the right approach to reach millions." Pete Seeger, Beacon, NY



WHY RECYCLE?
24½"x29"



RECYCLING IS FOR EVERYONE!
24½"x29¾"

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Plays and Songs

In addition to the plays and songs in this Teacher Resource Guide you might want to order: Mary K. King, Earth Aid First Aid Skit and Song Book, 1991, which includes more than 10 original songs and five skits. Ms. King is a teacher in the North Clackamas School District in Milwaukie. Her materials can be ordered directly at 9877 SE 33rd Avenue, Milwaukie, OR 97222, (503) 654-2969. The complete Earth Aid First Aid curriculum is available in all the North Clackamas schools, and on loan from Metro, and the Washington and Clackamas county solid waste offices.

Sample Songs from the Garbage Gurus album, *Out of the Dumps*

The Gurus (Bruce Reduce--Scott Becker, Toulouse Reuse--Peter Dubois, Michael Recycle--Todd Aschoff, and Grover Use-Over--Jeff Rubinstein) "first emerged out of the dumps in 1989 as a promotion for a local recycling center. Today, the GURUS are a quartet of recycling specialists who sing the praises of proper waste management with a downbeat." The Garbage Gurus would like to bring their special brand of "infotainment" to your school, fair or special event. To schedule their talent or order a copy of the *Out of the Dumps* tape, contact ORLO, P.O. Box 10342, Portland, OR 97210, (503) 242-2330. Our thanks to Peter Dubois for permission to reprint these samples.

Running Out of Landfill Space
We're running out of landfill space,
for all of our waste.
We're running out of landfill space.
(repeat verse)
What will happen to all the space,
with so much trash and so much waste.
There's too many people in the human race.
What will happen to all the space.
So don't throw it away
Or take it to the dump
Toss it in the trash
or burn it to ash.
Do those things you have to do
and be a garbage guru.
That's what we can do.
Yea, me and you, to make things right,
because
OUT OF MIND IS NOT OUT OF SIGHT,
OUT OF MIND IS NOT OUT OF SIGHT,
OUT OF MIND IS NOT OUT OF SIGHT.
copyright 1993 words and music by
Peter Dubois (Toulouse Reuse)

Milk Jug Stomp
Do the milk jug stomp (repeat 4 x's)
What I'll tell you next are five simple steps.
How to do the milk jug, the milk jug stomp.
We're gonna romp at the milk jug stomp.
Take off the cap, (take off the cap)
Rinse it clean, (rinse it clean)
Stomp it flat, (stomp it flat)
Make it lean, (make it lean)
When you're done, put it in the bin, (in the bin)
Take it to the curb, (to the curb)
and do a SPIN.
That's the milk jug stomp, the milk jug stomp,
That's the milk jug stomp.
We're gonna romp at the milk jug stomp.
(repeat)
copyright 1992 words and music by
Peter Dubois (Toulouse Reuse)

Other songs on the album include Compost, Garbage Soup, Garbage Gurus, Re:Recycle, 2, 4, and 6, Don't Buy Plastics, Yard Debris, Pickin' Trash, and Stinky Stinky Landfill.

Recycling to the Rescue
by
Bonnie McKinlay
Holcomb Elementary School, Oregon City, Oregon
Edited by The Oregon Department of
Environmental Quality

Cast:

Narrator
7 Trees
4 Children: Robin, Rosa, Randy, Robbie
4 Junk Pile Folks: Geraldine, Gloria, Gary, Gordon
Recycler
3 Children demonstrating recycling

Props:

4 Backpacks	1 Phone Book	Recyclable Items
2 Phones	Junk	Cardboard Wall

Scene 1: A Forest with Trees

Narrator: It is a wonderful day in an Oregon forest.

Robin: It sure is great to be out hiking in the woods again.

Rosa: You can say that again!

Robin: It sure is great to be out hiking in the woods again.

Randy: You can say...oh never mind!

Robbie: The air is so fresh out here, we're lucky to live in a state that has so many trees.

Rosa: You're right about that--it's peaceful in the forest, away from all the noise and smells of the city.

Robin: This beats a shopping mall any day!

Rosa: Yeah, I'd rather be in a forest than on a freeway.

Robbie: Let's stop for a snack.

Robin: Yeah, I have cookies in my pocket.

Randy: And I have some apples.

Rosa: Let's eat!

Narrator: Our hikers prepare for lunch...when suddenly they are startled by a thundering C R A S H!

(A tree falls. Hikers jump up in surprise.)

Randy: WHAT ON EARTH WAS THAT?

Robin: Sounds like timber to me.

Randy: Oh, no!

Rosa: Another good tree gone!

Robin: Why do they have to chop down the trees?

Robbie: Some trees are cut for lumber for houses.

Rosa: Some wood is used to make furniture.

Randy: Some trees are cut for paper.

Robin: We use a lot of paper at school!

Robbie: Way too much, if you ask me!

Rosa: We should think of ways to help save some of the trees, so we will always have a forest to hike in.

Randy: And the animals and plants will have a place to live and grow.

Robin: How can we help save the trees? (asks audience) Do you know?

Randy: I bet we could save lots and lots of trees if we ask the teachers to stop giving us assignments.

Robin: (Smiling) A splendid idea!

Robbie: MARVELOUS!

Rosa: Just think of all the extra time we would have...

Robbie: No. No. No. The teachers wouldn't go for that idea--they'd just get lonely for their marking pens and stickers.

Robin: You're right. We just can't have a bunch of sad-faced, cranky teachers on our hands.

(All children nod their heads.)

Rosa: There must be something we can do.

(EXIT)

Scene II: Landfill

Narrator: Our hikers have a problem to solve--HOW CAN THEY HELP SAVE SOME TREES? Little do they know, their answer is at the city landfill!

(Kids walk around holding their noses.)

Randy: Whew! What a smell!

Rosa: I can hardly breathe!

Robin: (Looking upward.) I don't know how those gulls can stand it!

Robbie: Let's not stick around too long--my nose is clogging up.

Robin: I'm choking! (coughs)

(Junk pile comes to life!)

Randy: Hey look at that!!!

Robin: What's going on?

Rosa: Shhh. Let's not make any noise, I want to hear what they have to say.

Geraldine: Move over will you?!

Gloria: No, you move over!

Geraldine: You, you hunk of junk!

Gloria: No, you! You piece of garbage!

Geraldine: Gosh, there's no place to move!

Gary: Stop arguing you two. Why fight? It's not your fault we're so crowded.

Gordon: I don't have enough room to rest my weary head!

Geraldine: I'm tired of being piled up here with you!

Gloria: It all wouldn't be so bad if we weren't so crowded.

Gary: Well, you can stop complaining, because the Friday morning garbage trucks are due in a few minutes.

Gordon: Oh, no! Not more garbage!

Gary: Yep. The garbage trucks just keep on coming.

Geraldine: Why do those people make SO much garbage?

Gloria: They just keep buying stuff and throwing it away.

Geraldine: The stuff comes into the people's homes in nice paper sacks and leaves their homes in garbage cans.

Gordon: You mean they buy stuff to throw it away?

(JUNK shrugs their shoulders)

Robbie: We DO make a lot of garbage, don't we?

Rosa: I know my family does--because it's my job to take out the garbage.

Randy: First we were concerned about the forest, now we're worried about too much junk!

Robbie: What next?

Geraldine: Listen to those kids; they sound as if THEY have problems.

Gordon: Yeah, they ought to live HERE.

All Kids: No way!

Gary: Well, you'd better think of something fast because we're running out of room!

Gloria: Yeah, and I'm sick of it! (Angrily kicking phone book toward kids who bend over to look at it.)

Robin: Hey, what's this?

Randy: Look! (points to phone book)

Robbie: Huh?

Rosa: What's the big deal?

Randy: Look! It says RECYCLING CENTER.

Rosa: Let's call them up! Maybe they can help us.

(EXIT)

Scene III: Home with phone, Recycling Center on other side of cardboard wall.

Narrator: Looks like our friends are hot on the trail of an answer to their problems.

Robin: (Dialing) Hello. May I speak to someone about recycling?

Recycler: Hello. May I help you?

Robin: Yes. You see, my friends and I are worried about the trees and the garbage.

Recycler: Oh yes. I know, you want more trees and less garbage, is that it?

Rosa: (Taking phone) It sure is. Can you tell us what to do?

Recycler: Sure. Everyone can make our world better with more trees and less junk.

All Kids: We can?!

Recycler: Yes. Here's how. At the store, you can avoid products that cannot be recycled, like styrofoam, and over-packaging. (Child off stage, but in sight of audience, laboriously unwraps package.) At home, you can sort your garbage. (Other children off stage sort and prepare materials.) Instead of putting everything in the garbage can, put washed bottles and jars in boxes labeled "Glass". Put washed and flattened tin cans, with their paper labels removed, in a box marked "Metal". Save and clean aluminum foil and aluminum pie plates and put them in a bag marked "Aluminum". Stack newspapers and tie them or put them in a paper bag. And stack and bundle the flattened corrugated cardboard. In most cities, these all will be picked up by your garbage hauler or recycler.

Randy: This will help make the dump less crowded!

Robbie: Sounds like a great idea!

Rosa: And it's all so easy, too. Just as easy as taking out the garbage.

Robin: Is there anything we can do at school?

Recycler: Yes!

Rosa: (To audience) Will you help us?

Recycler: (To audience) You can try to use both sides of your paper. Newsprint paper like this can be saved with newspaper for recycling. Some of the other paper can be recycled. (Give directions here if your school is recycling paper.) This white paper can go in the "White Paper" box. Be sure that there isn't too much crayon on it or it can't be recycled. Colored paper, except for the goldenrod color, goes in the "Colored Paper" box. Used paper towels and tissues should always go in the garbage, because they can be germy. And remember, try not to waste paper, or anything else. Save a tree! Come around...and recycle!!!

THE THROWAWAY THREE

PROPS

Person 1

This is the tale of the Throwaway Three,
Of Man and his Garbage throughout his-to-ry:
Now they're very nice people, like you and like me,
Who all have a problem, as you will soon see—
What shall they do with their garbage and trash?

All

Why, throw it! Or bury it! Or burn it to ash!

Person 3 — 50,000 BC (Cave dweller)

I am a cave dweller who lives on the ground. — Skins
What do I do with old stuff all around?
Why, burn it, like meat; burn it up in the fire;
Or bury it like bones, in the muck and the mire.

All

Yes, throw it, or bury it, or burn it to ash!
That's how we *always* get rid of our trash!

Person 1 — 200 BC (Roman)

I am a Roman who lives in the town. — Roman Helmet
Our laws won't allow me to just throw it down. — Bag of Trash
I have to drag it away for a mile
And then I can dump it, forget it, and smile!

Person 2 — 1200 AD (Briton)

I am a Briton, wary and quick; — Stack of Trash
Down on our street it can get pretty thick.
When housewives up there want to pitch out their goo,
They just leave it out there and yell:"Gardy-loo!"
(Person 1 stands on chair and yells, "Gardy-loo!")
It will stay there and stay there until the next rain,
Or until our fair London should burn down again.

All

Oh, what do we do with our garbage and trash:
We throw it, or bury it, or burn it to ash!

Person 3 — 1630 (Settler)

I am the settler. I came without much, — Pilgrim Hat
But everything else I must make with my hands.
So I don't throw out much — I use all I can.
Cloth scraps become quilts; I reuse my bent nails

It will be long time 'fore the next trade ship sails.

Person 1 — 1700 (Colonist)

I am a colonist; now life's not so tough. — Coonskin Hat
We have trade between cities that brings lots of stuff — Leather
And some things are made by our townfolk today,
I could buy a new harness, throw this old one away.
We have pigs and hogs running loose in our street,
If I toss it out there, they'll eat it up neat!

Or I might bury it right over there.
Or I might burn it; nobody would care.
You see; the New world is the same as the Old!
We trashmakers come from the time-honored mold.

All

What are we still doing with garbage and trash?
You guessed it! Throw it away, or bury it, or burn it to ash!

Person 2 — 1890 (Industrialist)

I'm the industrial person and new on the scene, — Engineer's Cap
I mass-produce goods with my trusty machine. — 3 Sweaters
This sweater, handmade, took a week in days of yore, — (One handmade;
But now in one hour, I can make forty-four. — two machine-made)
I make things so cheaply, you can now afford two
And throw out twice as much trash as you need to do.

Person 3 — 1950 (Scientist)

I am the scientific person in the new post-war age. — Lab Coat
We've learned a few tricks while the war shortage raged.
When we couldn't get natural stuff to process
We invented synthetics to replace the rest.

Person 2 (Industrialist)

Rayons and nylons, acrylics and plastics, — Nylon stockings
For furniture and clothing and even elastics; — Plastic Bags &
Forget your old woolens and silks and your cotton; — Containers
Real wooden toys and washboards are forgotten.

Person 1 (Scientist)

Our new stuff will last 'til forever, you see — Perma-pressed
Even when it's worn out to you and to me. — shirt
Permanent pressed, pre-sized and pre-shrunk
When dingy and old, it's still permanent "junk"
(Person 1 yells, "Junk")

Person 2 (Industrialist)

We make instant menus that come in a PACK. — Plastic Bag
You just boil the food in its own plastic sack. — TV Dinner
Or our TV dinner in its tinfoil tray
It's quick; you don't wash it; just throw it away!

Person 3 (Scientist)

We make lots of TVs and clothes dryers, too. — Broken Small
Don't ask for a trade-in; you're kidding, aren't you? — Appliance

Person 2 (Industrialist)

Our new cars all change with each model year, — Toy Car
Don't try to repair them, the cost's much too dear.
Besides, we don't bother to make last year's parts
For Skylarks, or Novas, of Cougars, or Darts.

Person 3 (Scientist)

It's the New Thing, the NEW that America craves.
So out, out with the old stuff, away to its graves.

Person 2 (Industrialist)

So what if there're more of us buying more goods?
So what if they won't rot away as they should?

Person 1 (Indian)

Now wait just a minute! You cannot fail — Indian Headband
To include me in your historic trash tale.
We Indians lived simply, on prairies, in woods,
We made no high trash piles , nor mass-produced goods.
Let me be your critic, show you where you stand;
And tell you just how you're defiling our land.
Your new-fangled goods will not rot away.
When you throw them all down they remain where they lay
Then you say you will bury them deep in the ground:
All your urban trash will make quite a mound!
So then you would burn it, in smoldering masses
And fill up our air with smoke, deadly gases!
Oh, all of your answers have faults everywhere:
You'll either ruin the water, the land, or the air.
What's more, your resources—your lumber, your ore—
Get smaller each year than the year before.
And what's more—this old earth's not making any more.

Person 2 (Industrialist)

You're right. Our resources are shrinking away — Throw Out Old
While our garbage problem grows bigger each day. — Blanket and
We're always converting resources to refuse — Cola Bottle
Instead of recycling them for reuse!

Person 3 (Scientist)

Oh stop it! Don't drop it! We'll think of a way — Pick Up
To make food for cows that's much better than hay. — Orange Peels
Don't burn it, return it—we'll make something new, — Clear Bottle
A vase or your mother, a spyglass for you. — Flower

(Flower in bottle for vase, flower out, bottle held up to eye for spyglass)
Don't bury it, carry it—back to the mill.
We'll make a new blanket to ward off the chill.
(Pick up old blanket and wrap around shoulders)

Person 2 (Industrialist)

It's time we progress past the Disposal Age
And make *recycling* the popular rage!
We'll have to give up old solutions for trash
And all realize that its pure balderdash — to just

All

Throw it, or bury it, or burn it to ash!

This skit was originally developed by the Atlanta Clean City Commission, and was reprinted with permission from A-way With Waste, a 1991 publication of the Washington Department of Ecology.

the resources

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Section Five: The Resources

- Who You Going to Call? Environmental Education Network 1-800-322-3326
- FYI: Trash Facts and Figures
- Glossary
- Local Resources (Listed by County)
  - Recycling Contact Persons
  - Field Trips, Classroom Speakers, Etc.
  - Re-use Services/Thrift Shops
  - Local History/Directory Information
  - Job Shadow Sites
  - Audio-Visual Resources
- DEQ Resources
- Annotated Bibliography
  - Selected Associations
  - Children's Books
  - Curricula and Activity Guides
  - Resource Books

Statewide Environmental Education Hotline

The Environmental Education Network is a toll-free hotline number (1-800-322-3326) available to disseminate information about materials, speakers, curricula, etc., related to natural resources and environment education to educators throughout Oregon. This number (formerly the hotline for the Environmental Education Association of Oregon) is focusing on materials available to teach about waste reduction and recycling, including the revised Rethinking Recycling curriculum, during 1993-94. In addition, the hotline will maintain a clearinghouse of information about all topics in natural resources and environmental education in Oregon, with the potential of expanding to serve a northwest region audience next year.

The hotline will list conferences, workshops, training sessions, and other meetings of interest to people involved in environmental education, whether in K-12 schools or other programs like 4-H, Parks and Recreation, etc., in addition to referencing printed materials and programs.

The goal of the network is to bring information to teachers and students quickly and easily.

Environmental Education Network

Paul Seitz, Director

Resource Information for Educators 1993-94 Emphasis on Waste Reduction and Recycling

FYI: Trash Facts and Figures

Trivia. Isn't it great? When you're up against a wall (or a classroom full of 6th graders the day before Christmas break), there is nothing better than a trivia contest, a game show, or some worksheets incorporating fun facts and figures. The ones we've compiled here are far from being complete, but gives you some useful comparisons upon which to base a classroom discussion or two. The best way to use trivia facts is NOT to use ours--assign your students to research some amazing facts to stump their friends (and teacher, if you're brave!) You might find it useful to compile a special folder for FYI stuff--just stick in notes, reprints of materials, brochures, etc., as you come across them. And remember that information changes. Try accessing an on-line data system for ready access to the most up-to-date data!

Creating Fact Sheets: While memorizing facts is never fun, most students will get excited about learning to translate facts into real-world (i.e. kid-relevant) equivalents. In Waste Wise, a solid waste lesson planner written by Dr. Joe Heimlich and published by the Aseptic Packaging Council, there is a suggestion to have students create a "fact sheet" to share information about solid waste using interesting facts and figures. The elephant example below comes from Dr. Heimlich. Facts and figures can be collected from a variety of places, and should be viewed as starting places--the equivalents that are meaningful will differ from grade to grade and subject to subject.

Weight Comparisons

Adapted from Waste Wise, 1991, by Dr. Joe Heimlich, Aseptic Packaging Council

- Call a zoo or the local library to find out how much an average full-grown elephant weighs.
- Weigh a pop bottle. How many bottles does it take to equal one pound?
- Multiply the weight of the elephant in pounds by the number of pop bottles in a pound. This is the number of discarded pop bottles it would take to equal one elephant.
- Find out the number of people in your community and state. Multiply each number by 365.
- Take that number and divide it by the number of pop bottles equal to one elephant. You are now ready to make this statement: If every person in (your community) or (Oregon) threw away one pop bottle per day for one year, the total weight of the pop bottles discarded would be equal to (fill in number) full-grown elephants.

A. Weight of Elephant _____
B. Weight of Pop Bottle _____
C. 1 pound divided by weight of pop bottle = # of pop bottles/pound _____
D. Weight of elephant (x) # of pop bottles/pound = # of pop bottles/elephant ____
E. Number of People in local community (x) 365 days/year = # pop bottles/year
F. Number of people in Oregon (x) 365 = # pop bottles/year ____
G. E or F/ divided by D = _____ (# of full-grown elephants per year)

This same process can be used for any type of waste and any comparison your students might want to make. One interesting comparison made at McBride Elementary in St. Helens concerns the number of trees saved by recycling paper. Since it takes 17 southeastern pine trees to make one ton of paper, McBride students decided that each ton of paper they recycle will save 17 trees. To dramatically illustrate the impact of their recycling efforts, the students make 17 paper mache' trees for each ton of paper the school recycles. The school corridor is becoming a regular old-growth forest!

Use the following trash facts to find information to help your students bring solid waste issues closer to home! The facts were collected from a variety of sources. Where the source is verified, it has been listed. If no source is listed, the fact has not been verified, but they float around everywhere. As a challenge for your interested students, have them try to validate data listed without sources! Our thanks to the California Department of Conservation Division of Recycling for their permission to reprint some of these facts.

According to the Environmental Protection Agency, the "Problem is Too Much Trash" (from EPA's Consumer's Handbook for Reducing Solid Waste, August 1992):

- in less than 30 years, durable goods (tires, appliances, furniture) and nondurable goods (paper, certain disposable products, clothing) in the solid waste stream nearly tripled
- the items listed above now account for about 75 million tons of garbage per year nationwide
- container and packaging waste is almost 57 million tons per year, making packaging the number one component of the nation's waste stream
- 1 percent of the nation's annual waste stream is almost 2 million tons of trash

From other sources, we discover:

- The 1992 Metro Recycling Report indicates that the Portland area recycled at a 38% rate--Senate Bill 66 requires a 50% rate by the year 2000.
- 1,134,523 tons of waste was landfilled in the Portland metropolitan area in 1992
- In 1985, Portland metropolitan residents sent enough garbage to the landfill to fill the Memorial Coliseum every month. By 1992, it only took 10 days to landfill enough garbage to fill the Coliseum!
- One thousand tons of uncompacted waste covers a half-acre of land three feet deep.
- Oregonians dispose of more than 2.5 million tons of waste per year--that's 1,580 pounds per person per year or 4.3 pounds per person per day. This is less than the amount generated by Californians and New Yorkers, but more than in many other countries in the world.
- As early as 1958, each person in America used about 404 pounds of packaging per year; in 1971, about 525 pounds of packaging.
- In the middle of the 1980s, three million cars, 100 million tires, 40 million tons of paper, 28 billion bottles, 60 billion cans, and four million tons of plastic were thrown away by Americans every year. Recent estimates show us at seven million cars, 100 million tires, 20 million tons of paper, 28 billion bottles, and 48 billion cans. The bill to collect this garbage is $2.8 billion.
- In the U.S. in 1972, only 15 percent of the aluminum cans were recycled. By 1981, the figure jumped to 54 percent. In Oregon, more than 90 percent of aluminum cans are recycled--thanks to our Bottle Bill.
- In Oregon, refillable beer bottles are refilled an average of 12 times; soft drink bottles

15 times, before being sent to a glass recycling plant.

- In Japan in 1980, almost half of the paper used was collected for recycling.
- Recycling half the paper used throughout the world today would free more than 20 million acres of forest from paper production.
- By the mid-1980s, paper products used about 35 percent of the world's annual commercial wood harvest. Estimates at that time indicated it would jump to 50 percent by the year 2000.
- If a person threw away the equivalent of 2 aluminum cans per day, he or she would be wasting more energy than is used daily by each of one billion people in poorer countries of the world.
- During the first year of Oregon's Bottle Bill, the replacement of throwaways with refillable containers saved approximately 1.4 trillion BTUs per year--enough to heat the homes of 50,000 Oregonians.
- Americans throw away one third of their garbage immediately: the packaging part!
- For every 10,000 tons of waste materials recycled, 32.6 jobs are supported, compared to only 6.46 jobs supported when that much waste is landfilled.
- Of the garbage Americans throw out, half could be recycled--enough to fill a football stadium from top to bottom every day.
- By 2005, 70 percent of Oregon's present landfills will be at capacity and that trash will need to be disposed of in new places or in other ways.
- In landfills paper and even "biodegradable" plastics take "forever" to break down since sunlight and air are absent.
- The average baby generates a ton of garbage every year.
- About five million tons of dirty diapers are buried in landfills throughout the United States every year; consumers spend at least $1 billion annually to dispose of these.
- It is predicted that over 48 million tons of garbage in the U.S. will go to landfills or be burned by the year 2000. If we recycled this garbage, we'd have saved the equivalent of over 10 billion gallons of gasoline, enough to fill the tanks of over 15 million cars for a year!
- Recycling one ton of material saves three cubic yards of landfill space.
- Americans receive almost four million tons of junk mail every year. Most of it winds up in landfills.
- Every day, American families produce an estimated four million pounds of household hazardous waste.
- In the late 1980's the Mobro garbage barge from Islip, New York, was turned away from 11 states and five countries.
- In a lifetime, the average American will throw away 600 times his or her adult weight in garbage. If you add it up, this means that a 150 lb. adult will leave a legacy of 90,000 lbs. of trash for his or her children.

Steel Facts:

- One pound of steel makes 15.4 bi-metal cans today, while 20 years ago one pound of steel made only 9.2 bi-metal cans.
- Steel can be made from scrap using only 25 percent of the energy required to make the same steel from virgin sources.
- Making a ton of steel uses 1,970 pounds of iron ore, 791 pounds of petroleum coke, 454 pounds of lime, and 29 million BTU's of energy. The process requires treatment and disposal of 538 pounds of solid wastes and 242 pounds of air pollutants.
- Recycling a ton of steel reduces energy used by 74 percent, air pollutants created by

86 percent, water used by 40 percent, mining wastes by 97 percent and water pollutants by 76 percent.

- Every ton of steel recycled saves 2,500 pounds of iron ore, 1000 pounds of coal, and 40 pounds of limestone.
- If tin cans were really made of tin, you could crush them with your hand.

Aluminum Facts:

- Twenty years ago, one pound of aluminum made 19 12-ounce cans. By continuing to develop new technologies to reduce the can's weight, the industry now produces an average of 28 cans from every pound of aluminum.
- If Californians recycled all the cans they buy in one day, they would have enough aluminum to make 17 Boeing 727 jets.
- Americans use over 65 billion aluminum soda cans every year.
- Recycled cans are back on store shelves in as little as 90 days.
- Some 55,000 cans are recycled every minute nationwide.
- Our nation's consumers and industries throw away enough aluminum to rebuild our entire commercial airfleet every three months.
- Making a ton of aluminum requires about 8,000 pounds of bauxite, 1,000 pounds of petroleum coke, 966 pounds of soda ash, over 300 pounds of pitch, 238 pounds of lime, and 197 million BTUs of energy. In addition, 3,290 pounds of red mud, nearly 3,000 pounds of carbon dioxide, 81 pounds of air pollutants, and 789 pounds of solid wastes must be treated and disposed of.

Paper Facts:

- One ton of recycled paper saves 17 oxygen producing trees (each about 35 feet tall), 7,000 precious gallons of water, two to three cubic yards of landfill space and enough electricity to power the average home for six months.
- Recycling one stack of newspapers about 6 feet tall saves the life of one tree 35 feet tall.
- 175,266 tons of newsprint are used in Oregon in one year, according to the American Forest & Paper Assocation. This is the amount of newsprint available for recycling. According to data from Metro and DEQ, 78,000 tons of newsprint are disposed of in one year instead of being recycled.
- Half of the paper that America consumes is used to wrap and decorate consumer products.
- Every man, woman, and child in the United States uses the equivalent of 600 lbs. of paper each year (five trees worth). In the USSR (when it still existed), they use 25 lbs., and in China they use 2 lbs.
- The amount of office and writing paper discarded in the US each year is enough to build a wall 12 feet high from Los Angeles to New York City.
- For every household that recycles its daily newspaper, five trees are spared every year.
- Every year we use the equivalent of 120 corrugated cardboard boxes for every American.
- Over a billion trees are used to make disposable diapers every year.
- More than 500,000 trees could be saved each week if every Sunday newspaper was recycled.
- It takes 75,000 trees to print the Sunday New York Times.
- Each year, the average American uses a stack of paper as high as a two story house.

- Making paper from recycled paper uses 30 percent to 55 percent less energy than making paper from trees.
- 50 percent of all paper produced in the US is used for packaging.
- Recycling half of the world's paper would free 20 million acres of forestland.
- Making a ton of paper requires nearly 3,700 pounds of wood, over 200 pounds of lime, 360 pounds of salt cake, 76 pounds of soda ash, 24,000 gallons of water, and 28 million BTUs of energy. In addition, making paper from raw materials means we must treat and dispose of 84 pounds of air pollutants, 36 pounds of water pollutants, and 176 pounds of solid waste.
- It will take 465 trees to provide one person with a lifetime of paper.
- According to the National Soft Drink Association, paperboard beverage cartons (like the 12- and 24-pack cartons) contain as much as 20 percent recycled fiber, making them one of the highest recycled-content products on supermarket shelves.

Glass Facts:

- The average American can save six pounds of glass in a month.
- Recycled glass uses only two-thirds the energy needed to manufacture glass from scratch.
- For every soft drink bottle you recycle, you save enough energy to run a television set for an hour and half.
- Glass is made from heating and molding sand. People have been making it for over 3,000 years!
- Making a ton of glass from raw materials requires over 1,300 pounds of sand, 433 pounds of soda ask and limestone, 151 pounds of feldspar, and 15.2 million BTUs of energy. As a by-product of the process, 384 pounds of mining wastes and 28 pounds of air pollutants must be treated and disposed of.
- When one ton of glass is recycled, water consumption is reduced by 50 percent, mining wastes by 79 percent, and air pollutants by 14 percent.
- Every month, Americans toss out enough glass bottles and jars to fill up a giant skyscraper.
- The energy saved from recycling one glass bottle will light a 100-watt light bulb for four hours.
- Glass takes a long time to break down; the bottle you throw away today could still be around over 1,000 years from now!

Plastic Facts:

- According to Dr. Jack Milgram, a plastics analyst, "Recycling plastics saves twice as much energy as burning them. Producing a fabricated plastic product from scrap instead of virgin resources saves some 85-90 percent of the energy used to make the resin."
- It takes 1,050 recycled milk jugs to make a six foot plastic park bench.
- Plastics in the ocean kill up to one million seabirds and 100,000 marine mammals each year.
- Over 46,000 pieces of plastic debris float on every square mile of ocean.
- Plastics, because of their bulkiness, take up 20 to 30 percent of landfill space.
- If the Pilgrims had 6-packs, we'd still have the plastic rings from them today.
- Plastic is made from one of the Earth's greatest buried treasures--oil.
- Plastic bottles can be recycled to make paint brush bristles, carpeting, jacket insulation, fence posts, park benches and many other items.

- If you lined up all the polystyrene cups made in just one day, they could more than circle the entire planet.
- Polystyrene never breaks down. 500 years from now someone could dig up the polystyrene cup you drank juice from today!
- Polystyrene foam is a danger to sea animals. Floating in the water, it looks like their food. If sea turtles eat polystyrene, they can't dive down into the water again because the foam makes them float. The foam eventually clogs their systems and the turtles starve to death.
- Polystyrene is now recyclable.
- According to the National Soft Drink Association, the soft drink container share of solid waste in the United States dropped 19 percent by weight and 24 percent by volume from 1988 to 1990. (Data from EPA/Franklin Associates.)

Other Facts:

Over a lifetime, each individual will use:

- 26 million gallons of water
- 21 thousand gallons of gasoline
- 10 thousand bottles
- 20 thousand cans
- 10 thousand pounds of meat
- 14 thousand quarts of milk
- 21 billion BTUs of energy (enough to boil 500 swimming pools full of water)

Savings from Product Manufacture Using Recycled Materials

	Paper	Steel	Glass	Aluminum
Water Use	60%	40%	50%	--
Water Pollution	35%	76%	--	97%
Air Pollution	73%	86%	20%	95%
Mining Waste	--	97%	80%	--
Energy	23-70%	47-74%	4-22%	92-97%

Some other comparison facts researched by Mary King that are useful for math problems related to waste:

Elephants weigh three to six tons (but have your students call the zoo anyway!)

Conventional school bus (empty) is 9' 10" by 35' by 8', weighs eight tons, and is 2,753 cubic feet inside

New style school bus (empty) 40' by 9' 10" x 8', weighs 10 tons, and is 3,147 cubic feet inside.

ESTIMATED ENERGY SAVINGS from RECYCLING WASTE MATERIALS

This chart clearly shows the impressive savings to be realized from recycling. It was compiled as an informational tool by Resource Recycling Magazine. Because the data is from many sources, directly comparing energy savings is difficult. The sources may have used different material classifications and examined different recycling processes. State energy offices collect information on residential and commercial energy consumption; this data can be compared easily.

Conversion Factors

BTU = British Thermal Unit
KWh = Kilowatt Hour

one barrel of crude oil (42 gals.) = 5.8 10^6 BTU
1000 cubic feet of natural gas = 1.0 10^6 BTU
one gallon of gasoline = .1276 10^6 BTU
one gallon of diesel fuel = .1303 10^6 BTU
one KWh = .003413 10^6 BTU
one barrel of crude oil (42 gals.) = 1699.38 KWh

CATEGORY OR GRADE	ENERGY SAVINGS IN 10^6 BTU/TON	PERCENT SAVINGS	SOURCE
[redacted]			
Steel	17.3	74	5
	19.0	50	6
• 40% scrap	1.6	10	3
• 100% scrap	7.8	47	3
• ingot	—	50-55	14
Steel and Iron	9.23	63	11
	15.48	65	12
Ferrous Metals	7.0	—	4
	8.89	62	2
	12.0	—	8
	12.1	—	10
	42.2	—	1
Aluminum	168.5	96	11
	168.5	96	2
	200.0	—	10
	200.0	—	8
	224.4	92	12
	232.0	95	6
	241.5	—	1
	259.4	96	3
	281.0	—	4
	—	95-97	14
	—	96	13
Aluminum Ingot	209.2 to 211.6	97	3
	210.4	—	16
Copper	46.0 to 49.0	88-95	3
	40.29	87	11
	47.5	—	16
	94.00	84	6
	94.74	85	12
	—	87	13
Lead	5.51	63	11
	15.00	56	6
	17.45	65	12
	—	63	13
Magnesium	346.00	97	6
Nickel	129.00	90	6
Zinc	11.84	60.1	11
	39.29	60	12
	47.00	72	6
	—	63	13
Non-ferrous Metals Other Than Aluminum	64.50	—	1
[redacted]			
Polyethylene	96.3	97	3
Polymer	—	90-95	14
Plastic	37.1	—	10

CATEGORY OR GRADE	ENERGY SAVINGS IN 10^6 BTU/TON	PERCENT SAVINGS	SOURCE
PAPER			
Newspaper	5.20	23	3
	9.60	—	4
	10.15	34	7
	12.00	—	10
• 33⅓% recycled fiber	1.23	27	19
• 100% recycled fiber	2.42	53	19
Paper	14.00	60	20
	14.00	62	18
	14.37	63	11
	35.50	64	12
	—	70	13
Lo-Grade	12.00	70	20
Paper Other Than Newsprint and Corrugated Cardboard	12.00	—	10
Writing and Printing	16.42	33	7
Office Paper	25.10	—	4
Tissue and Sanitary	26.40	54	7
Corrugated	6.29	24	7
	12.20	—	4
Paperboard	—	10-20	14
Linerboard	.61	23	19
[redacted]			
Glass			
• 20% cullet	.59	4	17
• 50% cullet	1.47	11	17
• 100% cullet	2.95	22	17
	1.30	—	4
	1.30	—	8
	2.00	14	18
	2.50	—	1
	2.50	—	10
	—	0-10	14
Containers	1.20	8	3
	1.20	—	16
[redacted]			
Rubber	22.00	70.0	18
	22.08	70.7	11
	22.08	71.0	12
[redacted]			
Insulation	8.54	—	9

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Glossary

This glossary contains all the vocabulary words used in the lessons, as well as a few other terms used throughout the Rethinking Recycling materials.

acid: chemical substance capable of reacting with and dissolving certain metals to form salts, turning litmus indicators red, of reacting with and bases or alkalis to form salts, or having a sour taste
act: a degree from a legislative group (a law or rule)
activism: accomplishing an objective through aggressive action
advertising: making known or praising publicly, usually in order to sell something
alternative(s): choices between two or more things
barter: trade goods or services without the exchange of money
beliefs: something believed or accepted as true
bill: a proposed law offered to a legislative group
bioaccumulation: process in which certain substances (like pesticides or heavy metals) work their way into a river or lake, move up the food chain, and are eaten by aquatic organisms, which in turn are eaten by birds, mammals or humans, with the result that the substances become more and more concentrated in tissues and internal organisms as they move up the chain
biodegradable: capable of being broken down into simple substances or basic elements by microorganisms
bundle: group of objects tied, fastened, wrapped, or otherwise held together
career: a chosen pursuit or vocation to which one is committed
career biography: description of the progress of a person's career from one job to another
career path: progressive steps generally taken within a chosen vocation, especially where each step is prerequisite to the next
caustic: capable of corroding, burning, dissolving, or eating away by chemical action
caution: warning found on a moderately toxic substance (lethal dose: an ounce to a pint)
clean: remove contaminants and dirt
cleaning product: class of household products that are often corrosive or toxic, designed to remove contaminants and dirt
coding: method of labeling using symbols, letters or numbers, in this case to indicate the kind of plastic resin used to make various plastic products
collage: art work made by pasting materials and objects over a surface
community operated: facility or business generally owned and/or run by a local community instead of a for-profit business or government entity
compost: v. to decay; n. humuslike organic product generated from composting
composting: use of microbes to break down organic matter into a useful product
consequences: something that logically or naturally follows from an action or decision
conserve: preserve and protect natural resources from loss or waste
consumable: product designed to be used or eaten up or expended
consume: to waste, squander, or destroy totally; absorb or use up
consumer: a person who acquires goods or services for his or her own use and not for resale or production of other goods or services; a buyer; an organism in the food chain that ingests other organisms or organic matter
consumer demand/preference: indication by purchasers that a product or service is good or

wanted, demonstrated by repeated purchase and/or requests for the product or service
consumer habit: repeated behavior by a consumer, e.g. purchasing an item repeatedly without thinking about other choices
consumerism: theory that progressively greater consumption of goods is economically beneficial
container: a thing in which material is held or carried; receptacle
contamination: process by which something is made impure
convenience: being suited or favorable to one's comfort, purpose, or needs; increases comfort or makes work less difficult
corrosive: chemical agent that reacts with or attacks the surface of a material causing it to deteriorate or wear away
corrugated: shape in folds or parallel and alternating ridges or grooves, in this case the middle wavy layer of a cardboard box
crush: to press or squeeze to force out of shape
cultural mores: accepted traditional customs and usages of a given social group; moral attitudes; ways of behaving
cycle: to circle, return, or occur again
danger: warning label for hazardous substances that are extremely toxic (lethal dose is a drop to a teaspoon)
decay: to decompose or rot
decision criteria: the standard, rule or test by which a choice or decision is made
decompose: decay; rot; come apart; change form; break down into simpler components
degree: one of series of steps or stages in a process or course of action
deposit: money paid by consumer to retailer for returnable beverage containers, refunded to consumer when container is returned to store
disposable: designed to be thrown away after use
disposal: discharging, depositing, injecting, dumping, incinerating, leaking or placing of any waste into or on any land, air or water
dosage: amount of a substance to be administered or ingested
ecomanagement: using ecological criteria (relationships between organisms and their environment) to make decisions or choices when planning activities, processes, or purchases
economic: of or pertaining to the production, development, and management of material wealth
economic benefits: choices that increase material wealth
economic costs: choices that decrease material wealth
energy: the capacity to perform work or produce a change from existing conditions
energy costs: choices that deplete the supply or increase the cost or amount of energy available
energy intensive: requiring a great deal of energy
energy recovery: production of energy in a usable form from mass burning or refuse-derived fuel incineration, pyrolysis, or any other means of using heat for combustion of waste
environment/environmental: all the conditions, circumstances, and influences affecting the development or existence of organisms; of or pertaining to the environment
environmental costs: choices that decrease the availability and/or quality of the environment
environmental impact: effect a particular action or practice has on the environment or its components (land, air, or water)
environmental management: consciously planning and making choices to preserve or

protect the environment and/or its components
ethical: in accordance with the accepted principles of right and wrong that govern the conduct of a society or profession
finite resources: resources with a fixed or limited amount or availability
flammable: easily started on fire; capable of burning rapidly
franchised: business with approval to operate within a limited or restricted territory, in this case geographical boundaries for garbage or recyclables collection
garbage: all waste considered worthless and thrown away
generator: source of production, in this case of waste or recyclable material
global impact: effect a decision or action will have on the world or people worldwide
grants: funds bestowed on an individual, group or organization to allow it to conduct business or complete a plan
hazardous: substances which cause special problems because they are poisonous, explosive, corrosive of metal or skin, harbor disease-causing microorganisms, are radioactive, or are dangerous for any other reason
HDPE - high-density polyethylene: plastic resin used to produce milk jugs, two-liter soda bottle bases, and plastic grocery bags
hierarchy: a group of people, ideas, objects, etc., arranged in a graded series (high to low, good to bad, etc.)
human-made: items not naturally occurring; produced by human manufacturing processes
ignitable: category of hazardous substances that catch fire readily or explode easily (see also flammable)
incinerate/incineration/incinerator: reduce the volume of solid wastes by use of an enclosed device with controlled flame combustion; the furnace, boiler, kiln, etc., where wastes are burned under controlled conditions
independent: free from restrictions or constraints, in this case a hauler of waste materials who operates freely without territorial restrictions
industrial: of or pertaining to the commercial production of goods or services
information interview: a discussion initiated by a person seeking information, in this case about jobs or careers
ingredient: an element in a mixture or compound
integrated waste management: an approach to managing waste that includes all methods including reducing waste at the source, reusing materials, recycling and remanufacturing products, recovering energy from incineration of wastes and disposing of any remaining waste, usually in a hierarchical or preferred order
interview: face to face meeting or conversation with a specific goal in mind (gather information, share ideas or qualifications, etc.)
inventory: a detailed list of things in view or possession
irritant: hazardous substance that causes soreness or inflammation
issues: a point or matter of discussion, debate or dispute
landfill: a disposal facility at which solid waste is placed on or in the land
LDPE - low-density polyethylene: plastic resin used to make cellophane wrap, diaper liners, and some squeeze bottles
leachate: liquid that has percolated through solid waste and/or been generated by decomposition of solid waste--contains dissolved, extracted, or suspended materials. May contaminate ground or surface water, and is especially a problem in areas of high rainfall and porous, sandy-gravelly soil.
legal: of or pertaining to the law

lifecycle: the useful lifetime of a resource or product from its initial mining or manufacturing, through usable life, salvage or recycling for use in or as a new product
litter: waste materials carelessly discarded in an inappropriate place
luxury: something that is not essential but is conducive to pleasure and/or comfort
manufacture: to make products, especially on a large scale and using automated processes
manufacturing by-products: waste or leftover resources produced from the manufacture of products (not the intended product)
market research: asking questions of individual or retail consumers to determine the preferences or possibilities for sale of a particular product or service
material recovery facility (MRF): facility designed to remove usable products or resources from the waste stream
materialism: the theory or belief that physical well-being and worldly possessions constitute the greatest good and highest value in life; a great or excessive regard for worldly concerns
motive: an emotion, desire, physiological need or similar impulse that acts as an incitement to action
natural resources: a material source of wealth occurring in nature such as timber, fresh water, wildlife or a mineral deposit
necessity/need: an item, feeling or belief that is absolutely essential to achieve a certain result or effect, in this case, to sustain life
NIMBY: acronym for "not in my backyard"; an attitude taken by citizens who want a particular service or function to take place, but not in the immediate vicinity in which they live and/or work
non-toxic: not poisonous or dangerous to life
nonrenewable: natural materials which, for one reason or another (scarcity, length of time required for formation, rapid depletion rate, etc.) are considered to be finite and exhaustible
not-for-profit: an organization that provides a product or service without regard to making a profit for doing so
opinion survey: formalized collection of responses regarding individual attitudes, feelings or beliefs about a topic
organic: living or once living material
organic waste: material that is living or has been living that the user has determined is no longer useful and has "thrown away"
organisms: living individuals, plants, animals
packaging: the wrappings, container or sealing of a commodity
paint: a liquid mixture used as a decorative or protective coating that may contain hazardous substances
patchwork: a collection of varicolored patches of material sewed together, as in a quilt
pattern: a plan, program or model worthy to be imitated
personal costs: negative consequences to an individual of a decision or action
personal commitment: individual decisions or choices that are strongly supported by actions or behaviors
pesticide: any substance used to kill nuisance organisms
PET - polyethylene terephthalate: a plastic resin used to manufacture plastic soda bottles and other transparent containers that is the most commonly recycled plastic
phase: a distinct stage of development
plastic: any of various complex organic compounds produced by polymerization that can be molded, extruded, or cast into various shapes and films or drawn into filaments used as textile fibers

player: one who participates or is an interested party in an activity
poison: a substance that causes illness, injury or death, particularly by chemical means
political: of or pertaining to the study, structure or affairs of government, politics or the state
position: a point of view or attitude on a certain question
pp - polypropylene: a light, highly resistant plastic resin used in packaging, coating, pipes and tubes
precycle/precycling: making choices prior to purchase to reduce the amount of waste generated from the purchase--includes buying in bulk, buying recyclable packaging, using reusable bags, buying products with little or no packaging, etc.
priorities: taking precedence, or order of importance
private: business or enterprise not regulated by state ownership or control
problem: a question or situation that presents difficulty, uncertainty, or perplexity
product: something produced by human or mechanical effort or a natural process
profession: an occupation or vocation requiring training in the liberal arts or sciences and advanced study in a specialized field
prominence: condition or quality of being important, conspicuous, immediately noticeably or widely known
PS - polystyrene: plastic resin generally referred to as "styrofoam" that is used in coffee cups, egg cartons, and almost all packaging pellets
public interest group: body of people who have organized themselves to achieve goals they believe are in the interest of the general public or a specific segment of the public on a specific issue
PVC - vinyl/polyvinyl chloride: a plastic resin used to produce pipe
quality: degree or grade of excellence
quantity: an amount or number
questionnaire: a printed form containing a set of questions used to gather information from a significant number of people
raw materials: resources in their naturally-occurring, unrefined or unprocessed state
reactive: hazardous substance that undergoes an unwanted reaction when exposed to other substances
rebates: a deduction from the amount to be paid or a return of part of an amount given in payment
recyclable: a product made of materials that can be reused as material for new products
recycle: the collection and reprocessing of manufactured materials for reuse either in the same form or as part of a different product
reduce: lessen the amount, degree, extent, number or price, in this case, amount of waste
regulatory agency: government agency with the assignment to enforce regulations passed by legislative process
remodel: remake with a new structure; reconstruct
renewable resource: natural resource which can be renewed or regenerated by natural ecological cycles or sound management practices, such as trees and water
reprocessed materials: materials that have undergone a remanufacturing cycle
resources: a supply of something that can be used or drawn on
responsibility assumption overload: a sense that the individual must take personal responsibility for actions or effects that seem to be more than the individual can handle
responsibility: duty, obligation, or burden
responsible: legally or ethically accountable for the care or welfare of something

returnable: a beverage container on which a deposit is paid at the time of purchase for which the deposit is refunded when the container is taken back to the point of purchase
reuse: to extend the life of an item by repairing or modifying it or by creating new uses for it, generally in its original form
risk: possibility of suffering harm or loss; danger
role-play: to play the part of; act out
sanitary: of or pertaining to health
sanitary landfill: a site designated for the burial of wastes in which the waste is spread out, compacted and covered with a layer of dirt. The site is constructed to reduce hazards to public health and safety, and under federal law must include an impermeable lower liner to block the movement of leachate into ground water, a leachate collection system, gravel layers to control methane, and other features
scenario: an outline of a hypothesized or projected chain of events
self-reliance: reliance upon one's own capabilities, judgement or resources
simulation: act or process of imitating or acting like something, in this case acting out a planning and decision-making process using a credible scenario
social/cultural costs: negative results to society or culture from a particular decision or course of action
soil texture: characteristic of the ground that determines various properties (sandy, clay, etc.)
solution: the method or process of solving a problem
source separation: sorting recyclable materials into specific types (such as paper, aluminum, steel, and glass) by the person who last uses the materials before collection for recycling
source reduction: process of reducing the amount of waste generated at the source of the waste
stewardship: responsibility for management and use of a resource or place
subsidy: monetary assistance granted by government to a person or private enterprise
survey: examine or look at in a comprehensive way
swap: to trade one thing for another
symbol: something that represents something else by association, resemblance or convention
tax credits: monetary incentives provided for taking particular actions in the form of reduction of required taxes
toxic: hazardous materials that are poisonous, harmful, destructive or deadly
toxicity: the degree to which a poison is toxic
transfer station: a holding facility for garbage where waste is reloaded into large trucks for more cost-efficient transportation to landfills, recycling dealers, and resource recovery sites
trash: worthless or discarded material; refuse
trends: general inclination, tendency or direction
unregulated: an activity or entity that is not governed by legislative requirements
value: principle, standard or quality considered worthwhile or desirable
vermiculture: process of using worms and their by-products to produce partially decomposed organic waste material for use as a soil additive
volume: the capacity of a container; amount
warning: hazardous substance label for very toxic substances (lethal dose is a teaspoon to a tablespoon)
waste: materials determined to be of no value and thrown away
waste audit: process of assessing the amount and kinds of waste produced in a given time

period at a given site
waste stream: all materials being thrown away, including items which could be recycled or burned for energy recovery
waste reduction: reducing the amount of waste produced by careful buying, less wasteful practices, or reuse of materials
waste stream composition: components of the waste stream by kind of material (paper, plastic, wood, food, etc.)
waste management: process of dealing with waste
weight: a measure of heaviness or mass of an object

WASTE REDUCTION AND RECYCLING CONTACT PERSONS

STATE OF OREGON Department of Environmental Quality
811 S. W. Sixth Avenue Portland, OR 97204
General: (503) 229-5913 Toll Free: 1 (800) 452-4011 FAX: (503) 229-6977

DEQ Staff Responsible for Oregon Waste Reduction and Recycling Programs

Fred Hansen	Director, Department of Environmental Quality	229-5301
Mary Wahl	Administrator, Waste Management and Cleanup Division	229-5356
Pat Vernon	Manager, Headquarters Solid Waste Program	229-6165
Bob Barrows	Solid Waste Technical Assistance--Western Region	229-6975
Bill Bree	Solid Waste Reduction Policy Analyst	229-5934
Maggie Conley	Household Hazardous Waste Specialist	229-5106
Alene Cordas	Regional Solid Waste Staff Coordinator	229-6046
Bob Guerra	Solid Waste Technical Assistance--Western Region/Medford	776-6010
	Recycling Education Coordinator	229-6709
Linda Hayes	Solid Waste Technical Assistance--Eastern Region	
David Kunz	Solid Waste Technical Assistance--Northwest Region	229-5061
Jacquie Moon	Survey Coordinator	229-5479
Marti Pillon	Grants Coordinator	229-6738
Peter Spendelow	Recycling Specialist	229-5253
Jan Whitworth	Senior Policy Analyst	229-6434
Carolyn Young	Public Information Officer	229-6271

The columns below list the Oregon city and county government representatives responsible for local solid waste reduction and recycling programs. The final column lists individuals/groups which are instrumental in local programs. This list is not comprehensive: in most communities around the state, many others also are involved in local programs. *Information compiled September 1993 by the Solid Waste Section, Oregon Department of Environmental Quality, 811 SW 6th, Portland, OR 97204; telephone (503) 229-5913.* ***Note: Unless otherwise indicated, all area codes in this document are 503.***

In addition to the contact names, we have received additional information about local resources from some counties. If there is not information listed for your county or city, call the local contact persons for assistance. If you find out about resources that are not listed here, please contact DEQ Solid Waste (503-229-5913 or 1-800-452-4011) and we will add the information to our next edition of this Guide.

Unless otherwise noted, the "other local contacts" have the videos distributed by DEQ (Time's A Wasting and The Wonderful World of Recycle) available for loan to local schools. Where there are no "other local contacts" listed, the Wasteshed or County Program contact will have the videos.

City Program	Wasteshed or County Program	Other Local Contacts
Baker County		
Arthur Reiff, City Manager City of Baker City 1655 First Street PO Box 650 Baker City, OR 97814 523-6541	The Honorable Steven Bogart Baker County Court 1995 Third Avenue Baker City, OR 97814 523-8200	Loren Henry Baker Sanitary Service 3048 Campbell Street Baker City, OR 97814 523-2626

City Program	Wasteshed or County Program	Other Local Contacts
Benton County		
Mary Steckel, Manager Administrative Services Dept. City of Corvallis PO Box 1083 Corvallis, OR 97339 757-6916	Bob Wilson Benton County Environmental Health Dept. 530 NW 27th Corvallis, OR 97330 757-6841	Jeff Andrews or Pam Wald Corvallis Disposal Co. and Albany-Lebanon Sanitation PO Box 1 Corvallis, OR 97330 754-0444
Clackamas County (also see Metro Wasteshed)	Ken Spiegle Clackamas County Dept. of Trans. and Development 902 Abernethy Road Oregon City, OR 97045 655-8521	Metro Recycling Info. Center 600 NE Grand Portland, OR 97232 234-3000

Michael Jordan, City Administrator
City of Canby
PO Box 930, Canby, OR 97013 266-4021

Ron Partch, Administrator
City of Gladstone
525 Portland Avenue, Gladstone, OR 97027 656-5225

William Brandon, Administrator
City of Happy Valley
12915 SE King Road, Portland, OR 97236-6298 760-3325

Marlee Erickson, City Recorder
City of Johnson City
8021 SE Posey Street, Johnson City, OR 97267 655-5635

Kathy Kiwala, Recycling Coordinator
City of Lake Oswego
PO Box 369, Lake Oswego, OR 97034 697-6573

Darrell Lyons
City of Milwaukie
10722 SE Main
Milwaukie, OR 97222
659-5171

Mary King
9877 S.E. 33rd Ave.
Portland, OR 97222
(Author, Earth Aid First Aid Curric.)

Denise McGriff
City of Oregon City
320 Warner Milne Road, Oregon City, OR 97045 657-0891

Susan Miller, City Recorder
City of Rivergrove
PO Box 1104, Lake Oswego, OR 97035 639-6919

City Program **Wasteshed or County Program** **Other Local Contacts**

Tamara DeRidder, Planning Director
City of Sandy
39250 Pioneer Boulevard, Sandy, OR 97055 668-5533

Dennis Koellermeier
City of West Linn
22825 Willamette Falls Drive, West Linn, OR 97068 656-6081

Arlene Loble, City Manager
City of Wilsonville
30000 SW Town Center Loop East, Wilsonville, OR 97070 682-1011

Clatsop County

Mike Caccavano, City Engineer
City of Astoria
Comm.
1095 Duane Street
Astoria, OR 97103
325-5821

Debby Kraske
Clatsop County Board of

Commissioners
PO Box 179
Astoria, OR 97103
325-1000

McLaren Innes, chair
Reduce, Reuse, Recycle

City of Astoria
3023 Harrison
Astoria, OR 97103
325-2131, ext. 146
325-2309 (evenings)

Eugene Miles, City Manager
City of Seaside
989 Broadway
Seaside, OR 97138
738-5511

Jan Cook, Recycling
Coordinator
Seaside Sanitary Service
PO Box 510
Seaside, OR 97138-0510
738-5717

John Rippey
City of Cannon Beach
PO Box 655
Cannon Beach, OR 97110
436-1581

Columbia County

Rosalind Mallory, City Admin.
City of St. Helens
PO Box 278
St. Helens, OR 97051
397-6272

Bill Greene
Land Development Service
Courthouse
St. Helens, OR 97051
397-1501

Robin Stein or Glen Higgins
Land Development Service
Courthouse
St. Helens, OR 97051
397-1501

FIELD TRIPS: Hudson's Garbage Service, 58597 Old Portland Road, St. Helens, 397-1534
SPEAKERS: Robin Stein (see local contacts above) 397-7242
Ken Young, Recycling Coordinator, Waste Control, 1150 3rd, Longview, WA (206) 425-4302
VIDEOS: Once Is Not Enough, Recycling Waste, Time's A Wasting and The Wonderful World of Recycle

City Program	Wasteshed or County Program	Other Local Contacts

RE-USE SERVICES/THRIFT SHOPS:
St. Helens Action Mart, 2789 Columbia Blvd., St. Helens
St. Vincents De Paul, 231 S. 1st, St. Helens
Second Hand Rose, 2004 Columbia Blvd., St. Helens
Second Time Around, 224 S. 1st, St. Helens
Wyland's Trading Post, 292 S. 1st, St Helens
Rainer Thrift Store, 109 A. East, Rainer
Scappose Senior Thrift, Columbia River Hwy., Scappose
JOB SHADOW SITE: Columbia County Solid Waste Coordinator, Robin Stein

Coos County

Paula Bechtold, City Attorney
City of Coos Bay
PO Box 3295
Coos Bay, OR 97420
888-3245

Skip Sumstine, Director
Coos County Solid Waste Dept.
Courthouse
Coquille, OR 97423
396-3121

Les Golbeck
Les's Sanitary Service
PO Box 956
Coos Bay, OR 97420
267-2848

Jane Olbekson,
Volunteer Coordinator
City of Coos Bay
500 Central Avenue
Coos Bay, OR 97420
269-1181

Jan Clark
South Coast Recyclers
PO Box 1018
Bandon, OR 97411
347-2665 (message)
347-2446 (Mon-Wed)

Joseph Wolf, City Manager
City of Coquille
99 E. Second, Coquille, OR 97423 396-2115

Jim Allan, City Administrator
City of North Bend
PO Box B
North Bend, OR 97459
756-0405
756-6311 (FAX)

Randy Anderson
Star of Hope Recycling
1712 Sheridan
North Bend, OR 97459
756-1141

Crook County

Henry Hartley, City Admin.
City of Prineville
400 E. Third Street
Prineville, OR 97754
447-5627

Commissioner Fred Rodgers
Crook County Courthouse
Prineville, OR 97754
447-6555

Gary Goodman
Prineville Disposal
PO Box J
Prineville, OR 97754
447-5208

City Program	Wasteshed or County Program	Other Local Contacts

Curry County

Dennis Cluff, City Manager
City of Brookings
898 Elk Drive
Brookings, OR 97415
469-2163

Commissioner Rocky McVay
Curry County Board of Commissioners
PO Box 746
Gold Beach, OR 97444
247-7011
247-2718 (FAX)

Pete Smart or T.V. Skinner
Curry Transfer and Recycling
PO Box 1240
Brookings, OR 97415
469-2425

FIELD TRIPS: Brookings Transfer Station, Contact: Scott Turner Length: 1 hour Student Limit: 30 Student Age: Any school age Notice: 30 days
SPEAKERS: Scott Turner, P.O. Box 1240, Brookings, OR 97415
Pete Smart, P.O. Box 1240 Brookings, OR 97415
VIDEOS: Time's A Wasting and The Wonderful World of Recycle
HISTORY: Until three years ago all solid waste was incinerated, now it is all trucked to a landfill in Douglas County.

Deschutes County

Larry Paterson, City Manager
Patty Stell, Asst. City Manager
City of Bend
P.O. Box 431
Bend, OR 97701
388-5505

Dick Johnson
Deschutes County Solid Waste
61150 SE 27th Street
Bend, OR 97702
388-6581

Suzanne Johannsen
Bend Recycling Team
PO Box 849
388-3638
383-3814
382-2616 (FAX)

Joe Hannan, City Manager
City of Redmond
455 S. Seventh Street
Redmond, OR 97756
548-2148

Mike Bauer
OSU Extension Service
P.O. Box 756
Redmond,OR 97756
548-6088

FIELD TRIPS: Knott Landfill, Bend Recycling Depot Composting Site
SPEAKERS: Recycling: Suzanne Johannsen/Paula Kinzer, P.O. Box 849 Bend, OR 97709
VIDEO: Time's A Wasting and The Wonderful World of Recycle
RE-USE SERVICES/THRIFT SHOPS:
ARC Thriftshop, 210 N.W. Congress Bend
His Store, 246 N.W. 5th Redmond
Humane Society of Central Oregon, 519 N.E. 3rd, Bend
Humane Society of Redmond, 512 S. W. 6th Redmond
Opportunity Center of Central Oregon, 811 S.W. Evergreen, Redmond
HISTORY: Contact Al Driver, 388-6581

Douglas County

Nolan Young, City Manager
City of Reedsport
451 Winchester Avenue
Reedsport, OR 97467 271-3603

Lorna Dobrovolny, Waste Reduction Manager
Douglas County Public Works
Courthouse, Room 219
Roseburg, OR 97470 440-4527 or 1-800-477-0991 ext. 4527

City Program	Wasteshed or County Program	Other Local Contacts
Randy Wetmore, City Manager Janelle Stradtner, Community Development Department City of Roseburg 900 SE Douglas Avenue, Roseburg, OR 97470 672-7701		Douglas John Roseburg Disposal Co. Roseburg, OR 97470 672-1505
Bruce Long, City Manager City of Sutherlin PO Box 459, Sutherlin, OR 97479 459-2856		
Gilliam County	The Honorable Laura Pryor Gilliam County Court PO Box 427 Condon, OR 97823 384-6351	Althena Bird Gilliam County Court PO Box 427 Condon, OR 97823 384-2381
Grant County	The Honorable Kevin Campbell Grant County Court 200 S. Canyon Boulevard Canyon City, OR 97820 575-0059	Barbara Miller-Sohr Grant County Recycling PO Box 622 John Day, OR 97845 575-0187
		Sarolta Sperry Prairie City Recycling Team PO Box 431 Prairie City, OR 97868 820-4605

FIELD TRIPS: Recycling Depots:
Recycling Alternatives, P.O. Box 339, Canyon City, OR 97845 575-2251 Contact: Regina Valentine Prairie City, 131 N. MacHaley Ave., P.O. Box 431, Prairie City 97869, Ages: K-12, Contact Person: Sarolta Sperry, Number of Students: Up to 15, Length of Tour: 30 minutes, Advance Notice: 2 weeks Please write and give phone number.
SPEAKERS: Sarolta Sperry (see local contacts above), Specialty: Volunteer effort in rural communities.
VIDEOS: Time's A Wasting and The Wonderful World of Recycle
RE-USE SERVICES/THRIFT SHOPS: Methodist Church Thrift Shop, John Day
HISTORY: Grant County Recycling Inc. started the recycling effort in 1986. It is a nonprofit organization with priorities on education through schools and new media. Also sponsoring the yearly Earth Day celebration. Prairie City Recycling Team is a volunteer group that has been staffing the center since November 1991. Recycling Alternatives opened its doors in February 1992. There is no market available in our county.

Harney County	The Honorable Dale White Harney County Court PO Box 699 Burns, OR 97720 573-6356	Mary Hansen, Rimrock Recyc. (Dept. of Fish & Wildlife) PO Box 8 Hines, OR 97738 573-6553

City Program	Wasteshed or County Program	Other Local Contacts
		Randy Fulton C&B Sanitary Service 609 N. Broadway Burns, OR 97720-1556 573-6441

Hood River County

Charlie Warren, City Manager City of Hood River PO Box 27 Hood River, OR 97031 386-1488	Jim Lyon, Director Hood River Public Works 918 - 18th Street Hood River, OR 97031 386-2616	John Rath Hood River Garbage Service PO Box 757 Hood River, OR 97031 386-2272 Drew Hutchinson Hood River Recycling Comm. 1002 - 5th Street Hood River, OR 97031 386-7758

FIELD TRIPS: Hood River Recycling & Transfer Station, Inc., 3440 Guignard Drive, P.O. Box 757, Hood River, OR 97031-0024 Contact: R. John Rath and Don Durr, Length of tour: Up to 1 hour, Size Limitation: Up to 50 people, Ages: 5 years and older, Advance Notice requested.
SPEAKERS: R. John Rath and Don Durr, Hood River Garbage Service (see above)
VIDEOS: Time's A Wasting and The Wonderful World of Recycle
RE-USE SERVICES/THRIFT SHOPS:
Salvation Army, 1202 12th Street, Hood River
Cascade Thrift Shop, 2727 Cascade Drive, Hood River
HISTORY: Hood River Garbage Service Inc. has been the garbage business since January 1, 1973. They started the recycling center and transfer station October 1, 1980.
PHONE BOOK DIRECTORY: Hood River Recycling and Transfer Station, Inc. Residential and Commercial, daily or weekly pick-up of glass, newspaper, tin cans, cardboard, used motor oil, computer paper and non-deposit aluminum cans.

Jackson County

Brian Almquist, City Admin. City of Ashland 20 E. Main Street Ashland, OR 97520 482-3211	Brad Prior Jackson County Planning Dept. 10 S. Oakdale Medford, OR 97501 776-7554	Bob and Lois Wenker Gary Rigotti Ashland Sanitary Service 170 Oak Street Ashland, OR 97520 482-1471 Ken Hagen Ashland Recycling Task Force 20 E. Main Street Ashland, OR 97520 482-3211 (message)

City Program **Wasteshed or County Program** **Other Local Contacts**

Dave Kucera, City Admin.
City of Central Point
Central Point, OR 97502-2209 664-3321

Andy Anderson, City Manager
City of Medford
411 W. Eighth Street
Medford, OR 97501
770-4432

Sue Densmore
Rogue Disposal Service
135 W. Main Street
Medford, OR 97501
779-4161

FIELD TRIPS: Ashland Recycling Center, Wednesday through Sunday, 9:00 am to 5:00 pm. Water and Van Ness Streets, Contact: Diane Garcia 482-0759
Valley View Landfill and Recycling Center, Open daily 7:00 am to 5:00 pm, 3000 Valley View Rd. Ashland, OR 97520, Contact: Gary Rigotti 488-6460
SPEAKERS: Ken Hagen, Chair, Ashland Recycling Task Force, 488-5638.
Diane DeBey Garcia, Recycling Coordinator, Ashland Sanitary & Recycling, 482-0759.
VIDEOS: Time's A Wasting and The Wonderful World of Recycle
HISTORY: Ashland Sanitary and Recycling Service provides weekly curbside pickup for glass, aluminum, newsprint, cardboard and motor oil. A comprehensive office paper recycling program is available to local businesses. Two recycling centers service the area and accept curbside materials as well as translucent HDPE. Collection events for magazines and tin cans occur during Earth Week in April and Recycling Awareness Week in October. Free leaf and yard debris recycling is offered during October, November, March and April. Hazardous Waste collection occurs each year in May.

JOB SHADOW: Students could spend a day at both recycling centers.

Jefferson County

Don Wood, Jefferson County Road Dept.
PO Box 709
Madras, OR 97741 475-3627

Josephine County

William Peterson
City Manager
City of Grants Pass
101 NW "A" Street
Grants Pass, OR 97526
474-6355

Bill Olsen
Josephine Co. Environmental
Health Department
307 NW "B" Street
Grants Pass, OR 97526
474-5431

Pat Fahey
So. Oregon Sanitation
PO Box 6000
Grants Pass, OR 97526
479-5335

Klamath County

James Keller, City Manager
City of Klamath Falls
500 Klamath Avenue
Klamath Falls, OR 97601
883-5316

Keith Read
Klamath County Solid Waste Management
Veteran's Memorial Building
Klamath Falls, OR 97601
883-4696

City Program	Wasteshed or County Program	Other Local Contacts
Lake County	Jeremiah O'Leary, Lake County Commissioner 513 Center Street Lakeview, OR 97630 947-6004	Ray Simms, Lake County Planner 513 Center Street Lakeview, OR 97630 947-6004
	Iris Robison Lake County Road Dept. PO Box 908 Lakeview, OR 97630 947-6048	Bill Schrader, volunteer (Soil Conservation Serv.) 100 N. "D" St. #120 Lakeview, OR 97630 947-2202
Lane County	Ken Sandusky Lane County Waste Management Division 125 E. Eighth Street Eugene, OR 97401 687-4336	Mike Hamblen BRING Recycling PO Box 885 Eugene, OR 97440 683-3637

Jeff Towery, City Manager
City of Cottage Grove
400 E. Main Street, Cottage Grove, OR 97424 942-5501

Keli Osborn, Development Analyst
City of Eugene Planning and Development Department
Building and Permit Services
244 E. Broadway
Eugene, OR 97401
687-5288, 687-5288 (FAX)

Karyn Kaplan
University of Oregon/
Physical Plant
P.O. Box 3175
Eugene, OR 97403-0175
390-4000

Kenneth Hobson, City Manager
City of Florence
PO Box 340, Florence, OR 97439 997-3436

Michael Kelly, City Manager
City of Springfield
225 N. Fifth Street, Springfield, OR 97477 726-3700

FIELD TRIPS: Short Mountain Landfill/Methane Gas Recovery System Contact: Emerald People's Utility District
VIDEOS: Time's A Wasting and The Wonderful World of Recycle

Lincoln County	Pamela Kambur, Manager Lincoln County Solid Waste District 880 NE Seventh Street Newport, OR 97365 265-5747	

City Program	Wasteshed or County Program	Other Local Contacts

Kathleen Stockton, City Manager
City of Lincoln City
PO Box 50, Lincoln City, OR 97367 996-2152 996-7232 (FAX)

Sam Sasaki, City Manager
City of Newport
810 SW Alder, Newport, OR 97365 265-5331

Linn County

Rick Partipilo
Linn County Environmental
Health Dept.
PO Box 100
Albany, OR 97321
967-3821

Jeff Andrews or Pam Wald
Corvallis Disposal Co. and
Albany-Lebanon Sanitation
PO Box 1
Corvallis OR 97330
754-0444

Steve Bryant, City Manager
City of Albany
PO Box 490, Albany, OR 97321 967-4300

Joseph Windell, City Administrator
City of Lebanon
925 Main Street, Lebanon, OR 97355 451-7476

Dan Dean, City Manager
City of Sweet Home
Service
1140 - 12th Ave.
Sweet Home, OR 97386
367-5128

Sherman Weld
Sweet Home Sanitation

PO Box 96
Sweet Home, OR 97386
367-3535

Malheur County

Allen Brown, City Manager
City of Ontario
444 SW Fourth
Ontario, OR 97914
889-7684

Jim Kimberling, Director
Public Works Department
251 "B" Street West
Vale, OR 97918
473-5191

Scott Wilson
Ontario Sanitary Service
1108 SE Sixth Street
Ontario, OR 97914
889-5719

Marion County

Jim Sears or Terry Fristad
Marion County Solid Waste Dept.
388 State Street, #735
Salem, OR 97301
588-5169

Mary Kanz
Mid-Valley Garbage and
Recycling Association
3680 Brooklane Road NE
Salem, OR 97305
390-4000

John Matthews
Garten Foundation
PO Box 17485
Salem, OR 97305581-4473

Dorothy Tryk, City Manager
City of Keizer
PO Box 21000, Keizer, OR 97307-1000 390-3700

Larry Wacker, City Manager
City of Salem
555 Liberty Street SE, Salem, OR 97301-3503 588-6255

Michael Scott, City Manager
City of Silverton
306 S. Water Street, Silverton, OR 97381 873-5321

David Kinney, City Administrator
City of Stayton
362 N. Third Avenue, Stayton, OR 97383 769-3425

Christopher Childs, City Administrator
City of Woodburn
270 Montgomery Street, Woodburn, OR 97071 982-5222

FIELD TRIPS: Marion Recycling Center, 3680 Brooklake Rd. NE/Salem, Length: 20 minutes
Ogden Martin, 4850 Brooklake Rd. NE/Salem, Length: 1 hour
Garten Foundation, 3334 Industrial Dr. NE/Salem, Length: 45 minutes
SPEAKERS: Mary Kanz, MVGRA, 390-4000
Terry Fristad, Marion County Solid Waste, 588-5169
John Matthews: Garten Foundation, 581-4473
VIDEOS: Time's A Wasting and The Wonderful World of Recycling
Call Terry Fristad for names/information on additional videos available for loan.
RE-USE SERVICES/THRIFT SHOPS:
Allied Merchants Association, 1311 Edgewater NW, Salem, 371-8737
American Cancer Society, 241 Commercial NE, Salem, 370-8660
The Clothes Rack, 617 Wallace Rd. NW, Salem, 364-6049
Colleen's Closet 360 Liberty St. SE/Salem, 363-1759
Dazy Maze Consignment Shop, 5040 River Rd. N, Keizer, 399-3516
Garage Sale Liquidators, 3579 Cherry Ave. NE, Salem, 390-0413
Goodwill Industries of the Columbia Willamette, 2655 Portland Rd. NE, Salem, 585-9423
Humane Society Shop, 311 Commercial NE, Salem, 362-6892
Our Father's House, 450 Court NE, Salem, 588-4034
Rags to Riches, 3595 Liberty Rd. S, Salem, 588-9286
St. Vincent De Paul Store, 1550 Fairground Rd. NE, Salem, 364-3210
Salvation Army Thrift Store, 162 Lancaster Dr. NE, Salem, 581-8377
1085 Broadway NE, Salem, 363-9346
Teen Challenge Thrift Store, 3946 Portland Rd. NE, Salem, 585-2226
Union Gospel Mission, 345 Commercial NE, Salem, 362-3983
Value Village, 2460 Mission SE, Salem, 362-8858
Veteran Thrift Center, 1122 12th SE, Salem, 588-1453
HISTORY: Curbside Recyclables: Aluminum/tin cans, newspaper/cardboard, glass, motor oil.

Recyclables accepted at depots:
Garten Foundation - Scrap paper, newspaper, cardboard, paper bags, tin cans, aluminum, glass, milk jugs and magazines.
Magazine Drop off locations: Salem Transfer Station, Garten Foundation, Payless parking lot in Salem/ Woodburn, Santiam Sanitary Service, United Disposal service, Lind's Market parking lot in Mt. Angel
JOB SHADOW: Joan Brentano, United Disposal Service, 2215 N. Front, Woodburn, 981-1278
Terry Fristad (see county contacts above)
John Matthews (see local contacts above)

Metropolitan Service District (Metro)

(see also Clackamas, Multnomah, and Washington counties)

Jim Goddard
Metro
600 NE Grand
Portland, OR 97232
797-1678

Metro
Recycling Info. Center
600 NE Grand
Portland, OR 97232
234-3000

Metro Public Affairs
Sharon Gregory
797-1521
Freda Sherbourne
797-1522

Metro Public Affairs has speakers and classroom presentations and puppet shows available. Call to get more information or to schedule a visit. Metro Recycling Information Center Recycling Information Center has print publications and curriculum lending library available in addition to the audio-visual materials listed below.

Other contacts that serve Metro-wide audiences:

Jeanne Roy
Recycling Advocates
2420 S.W. Boundary Street
Portland, OR 97204
244-0026

Pat Bozanich,Coordinator
Master Recycler Program
OSU Extension Service
Suite 450
800 N.E. Oregon St. #10
Portland, OR 97232
731-4104

VIDEOS: Time's A Wasting, The Wonderful World of Recycle

For length, format and other information about these additional A-V materials, call source.
Available from Metro Recycling Information Center: Creating Energy from Garbage (9-12); Once is Not Enough (K-12); The Great American Wild Waste Show (7-12); Recycle This! (7-12); Recycling,

Lifestyle with a Future (K-6); Recycling Waste Into Wealth (6-12); The Rotten Truth (4-12); The Trash Monster (4-6); Trash Trouble and the Recycle Rescue (K-3); Waste Not Want Not (9-12); Wizard of Waste (K-3)
Available from Portland School District Film Library (249-2000): Recycling (7-12); Recycling in Action (7-12); Recycling Logic (6-12); Recycling Waste into Wealth (6-12); Uncle Smiley Goes Recycling (K-4) **Available from the Multnomah County ESD**: There's No Away to Throw It (Glass, Metal, Paper) (7-12); Resource Recovery (7-12)
Available from Washington County ESD: Conserving Our Natural Resources (4-12); The Garbage Explosion (7-12); Recycling Waste (4-12); Rubbish to Riches (4-8)
Available from Clackamas County ESD: Recycling Waste (4-12); Recycling Waste Into Wealth (6-12); Uncle Smiley Goes Recycling (K-4)
FIELD TRIPS: The following is a list of field trips provided by companies that prepare and/or process recyclable materials. These companies have indicated that they are willing to give tours to school children at their sites at no cost. Due to the volatility of the recycling market and its effect on these companies, it is recommended that you visit the site and/or talk to the manager prior to setting up a tour for your students.

Metro South Station
Tour recycling center and learn how recyclable materials are prepared for sale to markets. Tour transfer loading operation and observe tipping procedures. A tour of wetlands area is also available. The transfer station is owned by Metro and operated under contract by Waste Management.
Mailing address: 2001 Washington St., Oregon City, OR 97045
Field trip site: Same
Contact: Dan Dudley, 657-7947
Length of tour: 30 to 45 minutes
Number of students that can be accommodated: 20 to 30, including leaders
Ages for which tour is appropriate: Kindergarten and older
Hours: 9 a.m to 5 p.m. weekdays. Weekends tours may be arranged.
Advance notice: One week
Limitations: Close supervision of children recommended due to machinery in use and traffic moving in and out of facility. Group must stay together.

K. B. Recycling
Tour recycling center and learn how recyclable materials are separated/prepared for sale to markets.
Mailing address: P.O. Box 550, Canby, OR 97013
Field trip site: 8277 SE Deer Creek Lane, Milwaukie
Contact: Rob Guttridge, 659-7004
Length of tour: 15 minutes
Number of students that can be accommodated: 25 to 30
Ages for which tour is appropriate: Fifth grade and older
Hours: 8 a.m. to 4 p.m. Tuesday, Wednesday and Friday
Advance notice: One week
Limitations: Close supervision of children recommended due to machinery in use.

John Inskeep Environmental Learning Center
The Environmental Learning Center is built on a 10-acre reclaimed industrial site. In addition to public recycling depot, the center has wildlife habitat areas that include interpretive pathways surrounding two ponds, flowing streams, salmon enhancement fish-rearing facility, forestry

demonstration site and bird of prey viewing facility. Structures made from primarily recycled and reused materials including the Lakeside Education Hall and Hoggart Memorial Celestial Observatory.
Mailing address: 19600 S. Molalla Ave., Oregon City, OR 97045
Field trip site: Same
Contact: Lesley Winnop, 657-8400, ext. 2351
Length of tour: One hour
Number of students that can be accommodated: 300
Ages for which tour is appropriate: Pre-kindergarten and older
Hours: 8 a.m. to 5 p.m. Tuesday through Saturday; special Sunday tours from 1 pm to 4 pm
Tour hours: 8:30 a.m. to 3:00 p.m. Tuesday through Friday
Advance notice: Two to three weeks
Limitations: One adult supervisor for every five children. Center staff give a 10-minute introduction and teacher or center guide takes students on site. A small fee is charged.

Metro Central Station
Tour of facility includes recycling activities, loading trucks bound for the landfill, drop off center for recyclables.
Mailing address: 6161 NW 61st Ave., Portland, OR 97210
Field trip site: Same
Contact: Ralph Orrino or Tom Wyatt, 226-6161
Length of tour: 60 minutes
Number of students that can be accommodated: 20 to 30
Ages for which tour is appropriate: Kindergarten and older
Hours: 8 a.m. to 5 p.m. Monday through Friday
Advance notice: 3 to 4 days
Limitations: Supervision should be provided for children: for small children, one adult per 4-6 children; for older children one adult per 8-10.

Portland Recycling Team
Tour recycling center and learn how recyclable materials are separated and prepared for sale to markets.
Mailing address: 2005 N. Portland Blvd., Portland, OR 97217
Field trip site: Same
Contact: Joli Wilkinson, 228-5375
Length of tour: 20 to 30 minutes
Number of students that can be accommodated: Up to 30
Ages for which tour is appropriate: Preschool and older
Hours: 9 a.m. to 5 p.m. weekdays
Advance notice: One to two weeks
Limitations: Close supervision recommended; be aware of broken glass; do not climb on drop boxes.

Waste Recovery, Inc.
Tour facility to learn how waste tires are processed into fuel pellets.
Mailing address: 8501 N. Borthwick, Portland, OR 97217
Field trip site: Same
Contact: Mark Hope, 283-2261
Length of tour: 15 to 30 minutes
Ages for which tour is appropriate: Fourth grade and older

Number of students that can be accommodated: Up to 50
Hours: 8 a.m. to 4:30 p.m. weekdays
Advance notice: Two weeks
Limitations: Close supervision of children recommended due to machinery in area: children must stay in a group. Tour is outdoors and weather dependent.

Metro Composting Demonstration Centers
Demonstration sites feature 13 active residential scale compost systems. Centers are located throughout the metro area and are open to the public for self-guided tours, or special arrangement can be made for civic or school groups including special mini-workshops. Open year round but compost piles are dormant and unmaintained November through March.
Contact: Metro, 797-1700

Wastech, Inc.
Tour recycling center and learn how recyclable materials are separated and prepared for sale to markets.
Mailing address: 701 N. Hunt, Portland, OR 97217
Field trip site: 8600 N. Albina, two blocks north of Columbia Boulevard
Contact: Bruce Burgoyne, 285-5261
Length of tour: 30 minutes
Number of students that can be accommodated: 15 to 25
Ages for which tour is appropriate: Third grade and older
Hours: 8 a.m to 5 p.m. weekdays
Advance notice: Close supervision of children recommended due to machinery in use.

E Z Recycling
Tour recycling center and learn how recyclable materials are separated and prepared for sale to markets. Observe machines in use, including a baler, a conveyor, and a compactor.
Mailing address: 12820 NE Marx, Portland, OR 97230
Field trip site: Same
Contact: Ray Petermeyer, 255-2299
Length of tour: 45 minutes
Number of students that can be accommodated: 30 to 35
Ages for which tour is appropriate: Second grade and older
Hours: 10:30 a.m to 3 p.m. Tuesday, Wednesday and Thursday preferred
Advance notice: One week
Limitations: Close supervision of children recommended due to machinery in use.

Sandy Transfer Station
Tour recycling center and learn how recyclable materials are separated and prepared for sale to markets.
Mailing address: P.O. Box 747, Sandy, OR 97055
Field trip site: 1 1/2 miles east of Sandy on Highway 26
Contact: Sandy Transfer Station, 668-4660 for information.
Length of tour: 25 minutes
Number of students that can be accommodated: Up to 50
Ages for which tour is appropriate: Kindergarten and older
Hours: 9 a.m. to 5 p.m. Thursday through Monday

Advance notice: Two days
Limitation: Close supervision of children recommended due to vehicles moving in area. Children should wear close-toed shoes.

Portland Recycling Team
Tour recycling center and learn how recyclable materials are separated and prepared for sale to markets.
Mailing address: 2005 N. Portland Blvd, Portland, OR 97217
Field trip site: Northwest 15th and Kearney, Portland
Contact: Joli Wilkinson, 228-5375
Number of students that can be accommodated: Up to 30
Ages for which tour is appropriate:
Preschool and older
Hours: 9 a.m. to 5 p.m. weeks
Advance notice: One to two weeks
Limitation: Close supervision of children recommended due to broken glass in area. Children must not climb on drop boxes.

Smurfit Recycling
Observe the sorting and baling of many kinds of paper. Observe machinery in use including baler, moving conveyor, and front-end loader.
Mailing address: 1315 NW Overton, Portland, OR 97209
Field trip site: Same
Contact: Tom Mayer, general manager, 294-1560
Length of tour: 20 minutes
Number of students that can be accommodated: 25
Ages for which tour is appropriate: Fifth grade and older
Hours: 9 a.m. to 4 p.m. weekdays
Limitations: Close supervision of children recommended due to machinery in use.

Far West Fibers
Walk through Beaverton Recycling Center to see the process by which plastic containers, tin cans, glass and scrap metal are collected for recycling. Then tour the adjacent paper-baling plant and view the machinery that handles all grades of paper for recycling.
Mailing address: P.O. Box 503, Beaverton, OR 97075
Field trip site: 10750 SW Denney Road, Beaverton
Contact: John Drew or Mary Sue Smith, 643-9944
Length of tour: 20 to 30 minutes
Number of students that can be accommodated: 25 to 60
Ages for which tour is appropriate: Second grade and older
Hours: 9 a.m. to 4 p.m. weekdays
Advance notice: One week
Limitations: Close supervision of young children (one adult for every five students) is recommended due to large volume of traffic.

Forest Grove Disposal
Tour recycling center and learn how recyclable materials are separated and prepared for sale to markets.

Mailing address: P.O. Box 8, Forest Grove, OR 97116
Field trip site: 1525 B St., Forest Grove
Contact: Supervisor, 357-4848
Number of students that can be accommodated: up to 30, depending on age of students
Ages for which tour is appropriate: First grade and older
Hours: 9 a.m. to 5 p.m. Monday through Saturday
Advance notice: Three days to one week
Limitations: Closes supervision of children recommended due to large trucks moving in area.

Grimm's Fuel Company
Tour yard debris recycling facility* with discussion and observation of bush being ground up, sort by size and made into compost material.
Mailing address: 1631 SW South Shore Blvd., Lake Oswego, OR 97034
Field trip site: Highway 99W at Cipole Road, Sherwood
Contact: Rod Grimm, 692-3756
Length of tour: 15 minutes
Number of students that can be accommodated: A busload of students (up to 60 students).
Ages for which tour is appropriate: Third grade and older
Hours: Noon to 4 p.m. Monday through Thursday.
Advance notice: One week
Limitations: Due to the extreme hazard of large machines in use, students must either stay on the bus or stand in one location to observe the operation.

United Disposal
Tour recycling center and learn how recyclable materials are separated and prepared for sale to markets.
Mailing address: P.O. Box 186, Wilsonville, OR 97070
Field trip site: 9500 Boeckman, Wilsonville
Contact: Max Brentano
Length of tour: 15 minutes
Number of students that can be accommodated: 30
Ages for which tour is appropriate: First grade and older
Hours: 9 a.m. to 5 p.m. weekdays
Advance notice: One week
Limitations: Closes supervision of children recommended due to machinery in use. Children should wear close-toed shoes.

Smurfit Newsprint Corporation
Walk through mill to observe how paper is made. Tour includes observation of process of how waste newspaper is made into pulp.
Mailing address: 1400 Wynooski, Newberg, OR 97132
Field trip site: Same
Contact: Jack Brandrut, 538-2151
Length of tour: 1 to 1/2 hour
Number of students that can be accommodated: Up to 35
Ages for which tour appropriate: 12 and older
Hours: 9 a.m. to 4 p.m. weekdays, except Tuesday
Advance notice: One month
Limitations: Ear and eye production provided by Smurfit during the tour due to high noise hazard. Must wear close-toed shoes; no high heels allowed on tour. Slacks suggested.

City Program	Wasteshed or County Program	Other Local Contacts
Milton-Freewater Wasteshed		
Howard Moss, Superintendent Public Works Department City of Milton-Freewater PO Box 6 Milton-Freewater, OR 97862 938-5531	Howard Moss, Superintendent Public Works Department City of Milton-Freewater PO Box 6 Milton-Freewater, OR 97862 938-5531	Charles Norman/Tanya Smith Horizon Enterprises PO Box 472 Horizon Enterprises Milton-Freewater, OR 97862 938-5658
Morrow County	DeRoyce Lusher, Acting Director Morrow County Public Works Dept. PO Box 453 Lexington, OR 97839 676-9061, ext. 17	
Multnomah County (see Metro)		
Marilyn Holstrom, City Administrator City of Fairview PO Box 337 Fairview, OR 97024 665-7929		Nancy Bond, Recycling Coordinator East County Haulers Organization (ECHO) 109 N. Main #202 Gresham, OR 97030 665-5966
Lynda Kotta Community & Economic Development Department City of Gresham 1333 NW Eastman Parkway Gresham, OR 97030 661-3000		
Sue Kiel, Solid and Industrial Waste Manager City of Portland Bureau of Environmental Services 1200 SW Fifth Ave. #400 Portland, OR 97204 823-7740		Pete Dubois Environmental Services Portland Public Schools 501 N. Dixon Portland, OR 97227 331-3449
Jeff Steffen, Mayor City of Maywood Park 4510 NE 102nd, Annex 1, Portland, OR 97220-3334 255-9805		
Pamela Christian, City Administrator City of Troutdale 104 SE Kibling, Troutdale, OR 97060 665-5006		

City Program	Wasteshed or County Program	Other Local Contacts

Sheila Ritz, City Administrator
City of Wood Village
2055 NE 238th Drive, Wood Village, OR 97060 667-6211

Polk County

Gene Clemens, Sanitarian
Polk County Courthouse
Dallas, OR 97338
623-9237

Roger Jordan, City Manager
City of Dallas
PO Box 67
Dallas, OR 97338
623-2338

Lamonte Horton
Dallas Garbage Disposal
1030 W. Ellendale
Dallas, OR 97338
623-2552

Erik Kvarsten, City Manager
City of Independence
PO Box 7, Independence, OR 97351
838-1212

Polk County Extension Office
182 SW Academy Suite 202
Dallas, OR 97338
623-8395

Stan Kenyon, City Manager
City of Monmouth
151 W. Main Street, Monmouth, OR 97361-1616
838-0722

Darrel Brandt
Brandt's Sanitary Service
158 S. Pacific Highway
Monmouth, OR 97361
838-0464

Sherman County

Glen Pierce
Wasco-Sherman Health Dept.

400 E. Fifth Street, Annex A
The Dalles, OR 97058
296-4636

Lee and Karen Kaseberg
(Mid-Columbia Grain

Coop. and Recycl. Center)
92302 Kaseberg Lane
Wasco, OR 97065
442-5289

Growers

Tillamook County

Michael Mahoney, City Manager
City of Tillamook
210 Laurel Avenue
Tillamook, OR 97141
842-2472

Jon Oshel, Director
Tillamook County
Public Works Dept.
503 Marolf Loop Road
Tillamook, OR 97141
842-3419

Kris Woolpert, Coordinator
Tillamook County Recycling
PO Box 349
Oceanside, OR 97134
842-8305

FIELD TRIPS: Don Averill Recycling Center, (see address/phone below) Contact: Linda Shelley, Hours: Wednesday - Sunday 8:00 am - 4:30 pm, Size Limitation: None
CART-EM Recycling Program City of Manzanita, Contact: Randy Kugler, 368-5343, Hours: Tuesday and Sunday 11:00 am - 1:00 pm
Marie Mills Rehabilitating Services (recycles cardboards), 622 Blimp Blvd., 842-2539
SPEAKERS: Jon Oshel, Tillamook Department of Public Works (see county contact above)

City Program **Wasteshed or County Program** **Other Local Contacts**

Richard Powers/Eric Halperin, Tillamook County Recycling Advisory Committee (Leave message at Public Works) 842-4319
Kris Woolpert, Tillamook Recycling Educator and Promoter (composting and recycling), 842-3419
Kevin KacMarsky, Junior High Teacher/Recycling Coordinator, Tillamook Junior High (recycling furniture), 842-7531
Red McClannan, Vermiculture Bacteria Works (composting), P.O. Box 45, Rockaway Beach, OR 97136, 355-8022
VIDEOS: Time's A Wasting, The Wonderful World of Recycle
At Tillamook County Library, 842-4792 Garbage: The Movie/An Environmental Crisis and Recycling is Fun
RE-USE SERVICE/THRIFT SHOPS: Kitchen and Kaboodle, 1st and Hwy. 101, Tillamook, Hours: Wed-Sat 12:00-5:00 pm.
Beaver Mercantile, 24745 S. Hwy 101, 398-5720
Community Resources, Contact: United Methodist Church (out at the Blimp Base), 842-2224, Hours: Thursday and Saturday 11:00 am - 1:00 pm
Rental Center, 840 N. Main, Tillamook, 842-5596 (call for hours)
Wild Bills, 7165 Fairview, Tillamook 842-2660 (call for hours)
Don Averill Recycling Center, 1315 Eckloff Rd., Tillamook, 842-4588
JOB SHADOW: Tillamook County Department of Public Works, Contact: Jon Oshel, 842-3419
Nestucca Recycling Service, Contact: Ken Bailey, 392-3279
Don Averill Recycling Center, 1315 Eckloff Rd., Contact: Linda Shelley, 842-4588
City Sanitary Services, 2303 11th St., Contact: Lee or Doug Walker, 842-6262

Umatilla County

Emile Holeman
Umatilla Co. Board
of Commissioners
216 SE Fourth, Pendleton, OR 97801
276-7111

Edward Brookshier, City Manager
City of Hermiston
180 NE Second
Hermiston, OR 97838
567-5521

Mike Jewett
Sanitary Disposal Co.
PO Box 316
Hermiston, OR 97838
567-8842

Larry Lehman, City Manager
PO Box 190
1225 Airport Road
Pendleton, OR 97801
276-1811

Sue McHenry
Pendleton Sanitary Service
PO Box 1405
Pendleton, OR 97801
276-1271

Union County

Larry Dalrymple, City Manager
City of La Grande
PO Box 670
La Grande, OR 97850
962-1302

Hanley Jenkins
Union County Planning Dept.
1108 "K" Avenue
La Grande, OR 97850
963-1014

Ron Larvik
City Garbage Service
1202 Willow
La Grande, OR 97850
963-5459

City Program	Wasteshed or County Program	Other Local Contacts
Wallowa County	Ben Boswell Wallowa County Court 101 S. River Enterprise, OR 97828 426-3586	Cathy Sterbenz Magpie Recycling PO Box 90 Enterprise, OR 97828 426-3608
	Verne Russell, Director Wallowa County Public Works 101 S. River Enterprise, OR 97828 426-4543	Mike Rahn Rahn's Sanitary Service PO Box 249 Enterprise, OR 97828 426-3492

VIDEOS: Time's A Wasting and The Wonderful World of Recycle
SPEAKERS: Magpie Recycling, 426-3608, P.O. Box 90 Enterprise, OR 97828
RE-USE SERVICES/THRIFT SHOPS:
Meekers River, Street and Fish Hatchery Road, Enterprise
Second Best, 204 Greenwood, Enterprise
Soroptomist Thrift, Monday 8:30 am - 4:00 pm., First Street, Basement of Odd Fellows, Tuesday 9:00 am - 3:00 pm, Enterprise Fellows Hall, Enterprise
HISTORY: Magpie Recycling began as a grassroots volunteer group in 1990. It progressed from a mobile trailer in Safeway's parking lot to its current building with baler and extensive storage. Besides monthly collection, it works with schools, businesses and civic organizations to get out the word on recycling.
JOB SHADOW: Rahn Sanitary, Contact: Ben Boswell 426-4543.

Wasco County

Bill Elliot, City Manager City of The Dalles 313 Court Street The Dalles, OR 97058 296-5481	Glen Pierce Public Health Dept. 400 E. Fifth Street The Dalles, OR 97058 296-4636	Art Braun The Dalles Disposal 1134 Oak Drive The Dalles, OR 97058 289-5149

Washington County
(see also Metro)

Delyn Kies or Lynn Storz Health and Human Services Dept. 155 N. First Avenue Hillsboro, OR 97124 648-8709	Joan Grimm Recycling Education 155 N. First Avenue Hillsboro, OR 97124 648-8609

Vergie Ries, City Manager
City of Beaverton
PO Box 4755, Beaverton, OR 97005, 526-2222

Jerald Taylor, City Manager
City of Cornelius
PO Box 607, Cornelius, OR 97113, 357-9112

Roger Gano, City Administrator
PO Box 23483, Durham, OR 97281-3483, 639-6851

City Program	Wasteshed or County Program	Other Local Contacts

Connie Fessler, City Manager
City of Forest Grove
PO Box 326, Forest Grove, OR 97116, 359-3200

Tim Erwert, City Manager
City of Hillsboro
123 W. Main Street, Hillsboro, OR 97123
681-6100

Mark Jockers
Unified Sewerage Agency
155 North 1st. Street #270
Hillsboro, OR 97124

John Buol, City Manager
City of King City
15300 SW 116th Avenue, King City, OR 97224, 639-4082

James Rapp, City Manager
City of Sherwood
90 NW Park Street, Sherwood, OR 97140, 625-5522

Lorene Edin, Acting Public Works Director
City of Tigard
13125 SW Hall Boulevard, Tigard, OR 97223-8199, 639-4171

Emily Kroen, Program Coordinator
City of Tualatin
PO Box 369, Tualatin, OR 97062, 692-2000, ext. 835

Wheeler County

Annette Warnell, City Recorder
City of Mitchell
PO Box 97
Mitchell, OR 97750
462-3366

The Honorable Lee Hoover or
Susan Humphrey, County Planner
Wheeler County Court
PO Box 327, Fossil, OR 97830
763-2911 (8 a.m.- noon)

Louie Brooks, Operator
Fossil Landfill
763-2925 (H)

Yamhill County

Judy Ashley, Solid Waste Management Council
Yamhill County Planning and Development Department
535 E. Fifth Street, McMinnville, OR 97128
434-7516

Kent Taylor, City of McMinnville
230 E. Second Street
McMinnville, OR 97128
472-9371

Judy Toliver or Bob Emrick
City Sanitary
PO Box 509
McMinnville, OR 97128
472-3176

Darol Funk
West County Sanitary
PO Box 450
McMinnville, OR 97128
472-3176

City Program

Duane Cole, City Manager
414 E. First Street
Newberg, OR 97132
538-9421

Bruce Peet, City Manager
City of Sheridan
139 NW Yamhill
Sheridan, OR 97378
843-2347

Wasteshed or County Program

Other Local Contacts

Marvin Schneider
Newberg Garbage Service
PO Box 990
Newberg, OR 97132
538-1388

Recycling Films Available from DEQ

These films are considered "golden oldies" in the recycling world. They can be ordered by mail or checked out in person, free of charge, from DEQ's Public Affairs Office (address below). For other audio-visual materials, contact your county wasteshed representative or your Education Service District media center.

- **Recycling Waste Into Wealth** (VHS, 29 minutes): Considered the most up-to-date, comprehensive recycling film. Discusses limited landfill space, common household recyclables, collection, processing, and how to prepare materials. Produced by Bullfrog Films, Portland, in 1983 for a national audience. For 5th grade-adults.
- **Once is Not Enough** (VHS, 21 minutes): Very useful for a wide range of audiences; focuses on glass recycling to make points about issues ranging from landfills to consumer choices. For 3rd grade-adults.
- **Recycling Our Resources** (16mm, you supply extra reel, 1600 feet maximum; 10 minutes): Although this 1973 film is somewhat outdated, it looks at the timeless issues involved in siting landfills, e.g. air and water quality, etc. It also discusses processing materials like glass, newsprint, and metals; reuse; and recovery. For 1st grade-adults.
- **Glass Recycling, Paper Recycling, Metal Recycling** (16mm, you supply extra reel, 1600 feet maximum; 8-10 minutes per film) Three films developed in the late '70's by the Multnomah Education Service District. They are fast-moving visual essays (without narration) which highlight the use, reuse, and disposal process for glass, paper, and metal. Each film may be ordered and shown independently of the others. For 6th grade-adults.

ALWAYS PREVIEW MATERIAL BEFORE SHOWING TO A GROUP!

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return to DEQ Public Affairs, 811 SW 6th, Portland, OR 97204

mark one: please hold for pickup in Portland_____mail_____(allow 10 working days for mail delivery)

*film title(s):*_____

*needed from (dates):*_____*to*_____

*your name:*_____

*address:*_____

*city:*_____*zip:*_____

*daytime phone number:*_____

*your title/affiliation:*_____

Bibliography

Activity Books, Children's Books

- 365 Ways for You and Your Children to Save the Earth One Day at a Time, Michael Viner w/ Pat Hilton, Warner Books, NY, 1991.
- 50 Simple Things Kids Can do to Save the Earth, Andrews and McMeel, Ed. The Earth Works Group, 1990. Explains how specific things in a child's environment are connected to the rest of the world, how individual habits affect the planet, suggests environmentally sound habits and projects.
- Agatha's Feather Bed: Not Just Another Wild Goose Story, Peachtree Publishers, Ltd., 494 Armour Circle NE, Atlanta, GA 30324, (404) 876-8761, Garmen Agra Deedy, 1991. When Agatha buys a new feather bed and six angry naked geese show up to get their feathers back, the incident reminds her to think about where things come from.
- Anthony Anthony's Boring Day, Doubleday & Co. Inc., 666 Fifth Ave, New York, NY 10103, Dennis Reader, 1992. Acting on his grandfather's advice, Anthony combats his boredom by taking on such environmental projects as saving the rain forests and mending the hole in the ozone layer.
- Aunt Ippy's Museum of Junk, Harpercollins, Inc., 10 E 53rd St., New York, NY 10022, (212) 207-7000, Rodney Alan Greenblat, 1991. A brother and sister visit their ecology-minded Aunt Ippy and her world famous Museum of Junk.
- The Berenstain Bears Don't Pollute (Anymore), Random House, Inc., 201 E. 50th St., New York, NY 10022, (212) 751-2600, Stan and Jan Berenstain, 1991. The bears in Bear Country grow concerned about how pollution and waste of natural resources are damaging the world around them, so they form the Earthsavers Club.
- Brother Eagle, Sister Sky!: The Words of Chief Seattle, Dial Books for Young Readers, 2 Park Ave., New York, NY 10016, (212) 725-1818, illustrated by Susan Jeffers, 1991. A Snoquamish Indian chief describes his people's respect and love for the earth, and concern for its destruction.
- The Care Bears and the Big Cleanup, Random House, Inc., Bobbi Katz, 1991. When Lisa and Simon move to the country and discover that litter is ruining the woods, they join forces with the Care Bears to motivate the community into organizing the Big Clean-up.
- Caring for. . . (Our Air, Our Land, Our People, Our Water), Enslow Publishers, Carol Greene, 1991. Series of books with simple text and illustrations describing environmental issues and ways children can help control the problems, preserve resources, and take care of the earth.
- Caring for Planet Earth: The World Around Us, Lion Publishing Corp., Barbara Holland and Hazel Lucas, 1990. Describes different environments around the world, interdependence of plants, animals and people, depletion of natural resources and wildlife species, and efforts to protect the earth's natural environment.
- The Chemo Kid: A Novel, HarperCollins Inc., Robert Lipsyte, 1992. When the drugs he takes as part of his chemotherapy suddenly transform him from wimp into superhero, sixteen-year-old Fred and his friends plot to rid the town of its most lethal environmental hazard: toxic waste in the water supply.
- Children's Atlas of the Environment, Rand McNally & Co., 1991. Maps and text portray the world's ecosystems, environmental concerns, and positive suggestions of what can be done to help the plant.

- Dinosaurs to the Rescue!: A Guide to Protecting Our Planet, Little Brown & Co., Inc., Laurie Krasny Brown and Marc Brown, 1992. Text and illustrations of dinosaur characters introduce the earth's major environmental problems and suggest ways children can help.
- Earth Book for Kids: Activities to Help Heal the Environment, Linda Schwartz, 184 pp., $9.95.
- Earth Child, Games, Stories, Activities, Experiments & Ideas About Living Lightly on Planet Earth, Council Oak Books, Tulsa, OK, 1-800-247-8850, Kathryn Sheehan & Mary Wardner
- Ecology: Our Living Planet, Gareth Stevens, Inc., 7317 W. Green Tree Rd., Milwaukee, WI 53233, (414) 466-7550, P. Hogan. Presents at the primary level a survey of pressing issues of conservation as they affect the earth. Adapted from Steven Seidenberg's Ecology and Conservation.
- Eli's Songs, Macmillan Publishing Co., Monte Killingsworth, 1991. Shipped off to relatives in Oregon while is father is touring with a rock band, twelve-year-old Eli comes to love the magnificent trees of a nearby forest and tries to prevent their imminent destruction.
- The Environmental Detective, HarperCollins Inc., Douglas Herridge and Susan Hughes, 1991. Explains how to be an environmental detective by observing clues that reveal information about backyard ecosystems. Includes activities and space to write in observations.
- Fourth Grade Loser, Troll Associates, 100 Corporate Dr., Mahwah, NJ 07430, Ellen Kahaner, 1992. Rich kid Mike Russell's campaign to make friends in the fourth grade brings him in conflict with his father, a real estate developer, when the class decides to oppose the development of forest land near the school.
- Garbage! Where it Comes From, Where it Goes, Simon & Schuster, Evan & Janet Hadingham, 1990, 48 pp., grades 3-6. From NOVA television series, traces trash from domestic and industrial sources through processing and on to waste-disposal sites. All you ever wanted to know about society's wastes. Paperback $5.95.
- Garbage, Greenhaven, Robert Anderson, 1991. 32 pp. grades 4 up. A how-to book, analyze and understand the garbage issue by following the waste stream. Readers absorb factual background while learning how to attack big questions. Hard, $9.95.
- Going Green: A Kid's Handbook to Saving the Planet, Puffin Books, John Elkington et al., 1990, 111 pp. Grades 3-7. A guide to saving the environment, including explanations of ecological issues and projects. Paper, $8.95
- The Great Trash Bash, Holiday House, Inc., 18 E. 53rd St., New York, NY 10022, Loreen Leedy, 1991. The animal citizens of Beaston discover better ways to recycle and control their trash.
- The Green Activity Book, Lion Publishing Corp., 1705 Hubbard Ave, Batavia, IL 60510, Meryl Doney, 1991. Presents facts about current environmental problems and includes relevant activities and projects.
- Grover's 10 Terrific Ways to Help Our World, Random House, Anna Ross, 1992. Grover describes ten ways to help the world, from planting trees to recycling trash. Published in conjunction with the Children's Television Network.
- Home Ecology, Fulcrum, Karen Christensen, 1990, 334 pp., grades 6-12. Simple and practical ways to green a home in every aspect of daily life: time, food, shopping, light, transportation. Paper, $15.95
- How on Earth Do We Recycle. . . (Glass?) (Metal?) (Paper?) (Plastic?), Millbrook Press, Brookfield, CT, various authors, 1992. Series of books that describe the

process of making and recycling each product, including ways to reuse materials for various creative projects.

- It's My Earth Too: How I Can Help the Earth Stay Alive, Doubleday, Kathleen Krull, 1992. Text and illustrations pay homage to the earth and its resources, including suggestions that children can follow to help preserve the environment.
- The Kids' Earth Handbook, Atheneum Publishers, Sandra Markle, 1991. Activities and experiments to demonstrate how living things interact with each other and the environment, instructions for making miniature ecosystems.
- The Kid's Environment Book: What's Awry and Why, John Muir Publications, Anne Pedersen, 1991, 181 pp., grades 5-8. Examines environmental problems, human's historic relationship with the earth, the role of industrialization in environmental change, and what must be done to repair the damage. Paper, $13.95
- A Kid's Guide to Protecting the Planet, National Resources Defense Council, see Associations list for contact information. Coloring and activity guide to help kids learn to protect the environment. Also available: The Rainforest Book, Teacher's Guide to the Rainforest Book, Amazon Days, Amazon Nights cassette of rainforest sounds, and Rainforest Rescue Products.
- A Kid's Guide to Social Action How to Solve the Social Problems YOU CHOOSE--and Turn Creative Thinking into Positive Action, Free Spirit Publishing, Barbara A. Lewis, 1991, see catalog list for contact information. Real stories about real kids who are making a difference at home and around the world, step-by-step guides to social action skills, tools, and ideas for getting this done. Up-to-date resource guide for social action groups, awards/recognitions for kids, etc., prepared by an elementary teacher.
- Let's Talk Trash: The Kids' Book About Recycling, Waterfront Books, 98 Brooks Ave., Burlington, VT 05401, Kelly McQueen and David Fassler, 1991. Discusses trash and the different ways it can be handled, with emphasis on recycling. Incorporates thoughts, questions, and drawings of children.
- Mr. Rumples Recycles, Hyacinth House Publishing, Barbara Anne Coltharpe, $6.50, 30 pp. Illustrated children's book.
- My First Green Book, Alfred Knopf, Angela Wilkes, 1991. Features environmental activities/projects in such areas as water pollution, recycling, acid rain, and wildlife gardens.
- The Non-Toxic Home, Jeremy P. Tarcher, Debra Lynn Dadd, 1986, 213 pp., grades 6 up. Reviews typical household toxics, track how toxics enter the body, learn to protect the most vulnerable at a reduced cost of living. Paper, $9.95
- Quill's Adventures in Wasteland, Quill's Adventures in the Great Beyond, John Muir Publications, 1991. Quill Hedgehog and the Great Beyonders and their adventures with villainous alley cat Mungo Brown, who plots to destroy the countryside and exploit the land.
- Recycle!: A Handbook for Kids, Little, Brown & Co. Inc., Gail Gibbons, 1992. Explains process of recycling from start to finish and discusses what happens to paper, glass, aluminum cans, and plastic when they are recycled into new products.
- The Recycler's Handbook: Simple Things You Can Do, EarthWorks Press, 1990.
- Recycling, Chelsea House, Rebecca Stefoff, 1991, 127 pp., grades 5 up. Analyzes society's wastes, traces the waste stream and how recycling and reuse minimize waste problems. Glossary, appendix, index, Cloth $19.95
- Recycling, Children's Press, Chicago, Joan Kalbacken and Elilie Lepthien, 1991. Shows how ever-growing tide of refuse threatens the environment and wastes

resources, and how recycling helps in conservation efforts.

- Recycling, Children's Press, Chicago, Jean F. Blashfield and Wallace B. Black, 1991. Discusses advantages of recycling and how we can help protect the environment from further damage.
- Recycling Garbage, Franklin Watts, Inc., Donna Bailey, 1991. Discusses how various waste materials are recycled, ways to act responsibly toward the environment.
- Save the Earth: An Action Handbook for Kids, Alfred A. Knopf, Inc., Betty Miles, 1991. An overview of the environmental problems of land, atmosphere, weather, energy, plants, animals, and people. Includes projects and a section on becoming an environmental activist.
- Teenage Mutant Ninja Turtles ABC's for a Better Planet, Random House, J. K. Rosser, 1991. Renowned warrior turtles use the alphabet to inform readers of the problems of pollution and environmental degradation, and what children can do to help protect the environment and the Earth's resources. Based on Teenage Mutant Ninja Turtles characters and comic books created by Kevin Eastman and Pete Laird.
- Trash, Carolrhoda Books, Charlotte & Bushey Wilcox, 40 pp., grades 3-6. Traces waste from home and business to transfer stations, landfills, or processing, attractive format for young readers, asks the questions how to handle it best. Paper, $5.95
- Trash Attack, Douglas & McIntyre, Candace Savage and Steve Beinicke, 1990, 56 pp., grades 3-7. Attractive, readable, informative, subtitled "Garbage, and what we can do about it"., special glossaries. Paper, $12.95.
- World, World, What Can I Do? Morehouse Publishing Co., Wilton, CT, Barbara Shook Hazen, 1991. A young child discovers, in a rhymed question and answer dialogue, what he can do to help his environment.
- The Wump World, Houghton-Mifflin, Bill Peet, 1970, 44 pp. grades K-4. Aliens from the planet Pollutus devastate the gentle Wumps' grassy, leafy world. After total exploitation, the Pollutians, leave to ravage another planet. A first green sprout shows again. Paper, $4.95.

Teachers' Guides, Curriculum Guides, Classroom Activity Guides

- 4th R Recycling Curriculum, San Francisco Recycling Program, 289 City Hall, San Francisco, CA 94102 (415) 554-4851, 1988. K-5th grade curriculum developed by San Francisco school teachers for use in the district. Includes teacher background information, history of recycling, local resources, and lessons/activities on environmental awareness/natural resources, What is our garbage made of?, current methods of waste disposal, and solutions to the garbage problem. 49 total lessons.
- Activities for Young Children About the Environment and Recycling (Mister Rogers), 1991, HDR and Family Communications, Contact Pete Lieben, HDR Engineering, Inc., 8404 Indian Hills Drive, Omaha, NE 68114-4049 (402) 399-1010 or Marketing Department, Family Communications Inc., 4802 Fifth Avenue, Pittsburgh PA 15213 (412) 687-2990. Also from HDR Engineering, Inc., Preschool Recycling Education Initiative, 709 Westchester Ave., White Plains, NY 10604-3103 (914) 328-8505. Recycling education program for preschoolers, video features Mr. Rogers.
- AVR Teacher's Resource Guide for Solid Waste and Recycling Education, Association of Vermont Recyclers, 1989 (currently being revised) K-12 activities, resources, and background information on solid waste management and recycling.
- A-Way With Waste A Waste Management Curriculum for Schools, Washington State Department of Ecology, 1990 (3rd edition), Contact: Department of Ecology Northwest Regional Office, 3190 - 160th Avenue SE, Bellevue, WA 98008-5452

(206) 649-7000

- Cornell Waste Management Institute, 468 Hollister Hall, Ithaca, NY 14853-3501, (607) 255-8444. Various titled publications for K-12 solid waste, recycling, and composting education, resources include audiovisual equipment, games, workbooks, posters, videos and computer disks.
- Department of Natural Resources Wisconsin Recycling Education Program, Wisconsin Department of Natural Resources, 101 S. Webster St. Box 7921, Madison, WI 53707 (608) 266-2711. Encourages and teaches youth to recycle and reduce solid waste. Recycling Study Guide, Classroom Activities and Resources. Single copies are free, multiple copies available at cost. K-3 and 4-12 Supplements, also The Fourth R, and Nature's Recyclers Activity Guide and coloring book.
- Earth Aid First Aid, Mary K. King, 1991. Available to teachers in North Clackamas School District's 12 schools. Others contact Mary K. King, 9877 SE 33rd Avenue, Milwaukie, OR 97222, (503) 654-2969. Curriculum and Resources for teaching waste reduction, recycling and related environmental topics in grades K-6. Includes resource box with materials for typical lessons including a papermaking kit, an environmental library, etc.
- Earthwatching III: An Environmental Reader with Teacher's Guide, University of Wisconsin Press, Institute for Environmental Studies, 114 N. Murray, Madison, WI 53715, (608) 262-4928, 1990. Collection of scripts from "Earthwatch", a radio program exploring environmental trends and concerns.
- Educator's Waste Management Resource & Activity Guide, California Department of Conservation, Division of Recycling, 1992 (916) 323-3508. Developed as an interim resource for teachers. Includes 20 classroom activities, fact sheet with trivia about waste, materials and resources, including individuals and organizations to assist California teachers in bringing recycling programs and waste management education into their classrooms.
- Entering Adulthood. Creating a Healthy Environment: A Curriculum for Grades 9-12. Network Publications, P.O. Box 1830, Santa Cruz, CA 95601-1830, Donna Lloyd-Kolkin, 1990.
- Enviro-cops/Enviro-Mentors Project, ARISE Foundation, Edmund Benson, 4001 Edmund F. Benson Boulevard, Miami, FL 33179-2384, 1993. Enviro-cops and Enviro-Mentors are dedicated to survival of the environment. Enviro-cops (elementary students) learn through creative hands-on activities how to reduce waste, recycle, make safety checks on indoor and outdoor environmental pollution, and stop careless and harmful toxic discharges. Enviro-mentors are successful young adults who are recommended through high school, university and college professors to share their expertise in environmental facts of life with children in the enviro-cops program. Schools are provided with a guidebook and lesson plans for setting up a program in the local area. Enviro-cops meet in a club format for an hour once a week, and the guide book includes lesson plans for activities to take place during the meetings.
- Environmental Education Compendium, A Cooperative Project of the California Department of Education, The California Energy Extension Service, and Sonoma State University. Series of curriculum materials reviews on environmental topics, first completed Energy Education in 1992, and the Waste Education volume in 1993. Reviews existing teaching materials grades K-12, evaluates them on teaching and learning, presentation and organization, content, and includes a sample of the material and information on how the materials fit in California's statewide curriculum.
- Florida Energy and Environment Program for Children, Florida Governor's Energy

Office, 214 S. Bronough St., Tallahassee, FL 32301, (904) 488-2475. State conservation curriculum for Florida kindergarten and first grade students.

- The Fourth R, Association of Vermont Recyclers, P.O. Box 1244, Montpelier, Vt 05601, (802) 229-1833. Recycling curriculum from AVR currently under revision, will be available fall 1993 or later.
- Garbology, Florida Department of Education, Jim Phillips. Classroom activities for grades K-12 to teach biology concepts related to waste, landfills, composting, etc. while reusing typical throw-away materials. Most activities require plastic beverage bottles as the basic equipment. Activities begin with learning about the containers themselves, and preparing them for use in various experiments: growing environments, mini-landfills, cartesian divers, and growing plants.
- The Hazard House, California Department of Toxic Substances Control, Education and Information Unit, P.O. Box 806, Sacramento, CA 95812-0806, (916) 324-1214. Professionally developed computer interactive media system for use with Apple II or Macintosh LC w/Apple II emulation computers. Teachers Guide, includes 7 activities on hazardous substances in the home, reading labels, routes of exposure, poison that looks like food, hazardous substance disposal, etc.
- Household Hazardous Education for Schools--Annotated Bibliography of HHW Education Materials, Household Hazardous Waste Project, 1031 Battlefield, Suite 214, Springfield, MO 65807.
- Into Adolescence. Caring for Our Planet and Our Health: A curriculum for grades 5-8, Network Publications, P.O. Box 1830, Santa Cruz, CA 95061-1830, Lisa K. Hunter, 1991.
- Keep America Beautiful, Inc., Mill River Plaza, 9 West Broad Street, Stamford, CT 06902, (203) 323-8987. Waste in Place (K-6) and Waste: a hidden resource (7-12), comprehensive curricula regarding solid waste management and recycling issues. States nationwide have adopted this as their own official "state" curriculum through the KAB local program option. Annual program review available at no cost.
- The Land We Depend On, Illinois Environmental Protection Agency, Office of Public Information, 2200 Churchill Road, Springfield, Illinois 63706, (217) 782-5562, Revised 1992. A 5-module learning packet for use with fifth graders. Each module contains background reading, handout/worksheet/classroom materials, and activity/experiment/project descriptions. Topics are Earth's Closed System, Waste Alert, Solid Waste/Litter, Hazardous Waste, and Recycling.
- Let's Reduce and Recycle: Curriculum for Solid Waste Awareness, U. S. Environmental Protection Agency, revised 1990. Order from EPA Resource Conservation and Recovery Act (RCRA) Hotline 1-800-424-9346. K-12 Curriculum, one of a series of publications regarding solid waste education. Others include Recycle Today: An Educational Program for Grades K-12, Adventures of the Garbage Gremlin: Recycle and Combat a Life of Grime (4-7 coloring book); Ride the Wave of the Future: Recycle Today (K-12 poster); School Recycling Programs: A Handbook for Educators. EPA also has consumer and general interest publications on waste reduction and recycling, all of which can be ordered in one phone call to the 800 number. Ask for all the materials they have on waste reduction and recycling, or for a look at other environmental topics ask for the teachers packet (K-6 or 7-12).
- Man and Environment Curriculum Guides, North American Association for Environmental Education, P.O. Box 400, Troy, OH 45373, (513) 339-6835.
- The No Waste Anthology, A Teacher's Guide to Environmental Activities K-12, California Department of Health Services Toxic Substances Control Program, P.O.

Box 942732, Sacramento, CA 94234-7320, (916) 322-0476. A collection of activities with sections regarding Natural Resources and Pollution, Solid Waste, and Hazardous Waste compiled to avoid "reinventing the wheel" while organizing multiple activity sources into a single document.

- Project Learning Tree, American Forest Foundation & Western Regional Environmental Education Council, 1250 Connecticut Ave. NW, Washington DC, 20036. Oregon Coordinator: Barbara Middleton, Oregon Forestry Education Program, Peavy Hall 227, Oregon State University, Corvallis, OR 97331-5702, (503) 737-2128. K-12 curriculum concerning forestry and related environmental topics. Oregon program includes teacher inservice training workshops.
- Project Wild and Project Wild Aquatic, Western Association of Fish and Wildlife Agencies and Western Regional Environmental Education Council, Oregon Coordinator: Shann Weston or Tony Faast, Oregon Department of Fish and Wildlife, P.O. Box 59, Portland, OR 97207, (503) 229-5400. K-12 curriculum for wildlife education. Oregon coordinators run teacher inservice training workshops locally.
- Ray Cycle...Phase II Activity Book, State of Connecticut Department of Environmental Protection, 165 Capitol Avenue, Hartford, CT 06106, 1991. Coloring and activity book to accompany a school assembly program for elementary school children in the state of Connecticut.
- Solid Thinking about Solid Waste An Environmental Curriculum for Grades Six to Nine, Kraft General Foods Environmental Institute, Deborah A. Becker, President, (708) 646-7261, Three Lakes Drive, Northfield, Illinois 60093-2753. Based on an approach to environmental education called "Issues Investigation", the nineteen lessons are divided into four goals: Science Foundations (8 lessons) Background Information on solid waste management; Issue Awareness (3 lessons) to teach skills in critical analysis of issues and alternatives analysis; Issue Investigation (4 lessons), framework to guide individual research projects; and Citizenship Action (2 lessons) reviews responsible citizenship action strategies and guides students to develop an appropriate plan of action on an issue of concern to them as individuals.
- Solid Waste Environmental Education Program, PO Box 666, Whitmore, MI 48198, (313) 971-7490. Elementary school program includes "Rad Ric Recycle" coloring books.
- Teaching Toxics: Creating Solutions to Household Pollution Activities and Information on Household Hazardous Waste, Association of Vermont Recyclers, 1992. Materials may be duplicated for use by schools only (DEQ owns this one, and will be glad to share copies.) Others contact Association of Vermont Recyclers, P.O. Box 1244, Montpelier, VT 05601. Activities to teach concepts related to household hazardous waste. Organized by grade level (K-3, 4-6, 7-8, 9-12) in four general topics "What is Household Hazardous Waste?, "The Routes of Household Hazardous Waste", "Hazardous Products: Problems and Solutions" and "Proper Management of Household Hazardous Waste".
- Think Earth, Educational Development Specialists, 5505 East Carson Street, Suite 250, Lakewood, CA 90713, (310) 420-6814. Commercially available comprehensive environmental education program. Received numerous awards, including the President's Environment and Conservation Challenge Award, and the Excellence Award for K-12 Curricula from the Solid Waste Association of North America. Includes units and accompanying videos for K-3 (Think Earth) and 4-6 ("e"). Grade 1, Conserving natural resources; Grade 2, Reduce Reuse and Recycle; Grade 3, Creating Less Pollution; Grade 4, Reducing solid and liquid waste; Grade 5, Pollution

solutions; Grade 6, Sustaining natural resources. Includes teacher guides, full-color posters, story cards, reproducible masters for handouts and tests, available supplementary materials include badges, watches, t-shirts, tote bags, tree wafers, etc. Priced at $40 per grade for complete unit with video or $120 per "Pack" of K-3, 4-6 units. Videos or units available independently at $25 each.

- Toxics in My Home? You Bet!, Local Government Commission, Inc., 909 12th St. Suite 205, Sacramento, CA 95814, (916) 448-1198, 1984. Developed by the Golden Empire Health Planning Center, includes one week units on household hazardous waste topics for grades K-12. Topics include identifying hazardous products, health effects, ways to reduce exposure to and safer alternatives for hazardous products.
- Waste Away, Vermont Institute of Natural Science, Bonnie L. Ross, 1989, 120 pp. Grades 4-8. Popular student-friendly solid-waste curriculum, Interdisciplinary, hands-on and carefully sequenced. Available through Paragon Books (see catalogs for contact information).
- Waste Wise, Concepts in Waste Management A Resource Guide for Teachers Using Concepts of Critical Thinking and Decision Making, Dr. Joe E. Heimlich, The Aseptic Packaging Council, 1991, 1000 Potomac Street NW Suite 401, Washington DC 20007. Includes lessons appropriate to multiple grade levels titled Volume of Waste, Options for Handling, Decisions on Packaging, Life Cycle of Product Packaging, and The Aseptic Package, as well as student handouts to support the activities.

Resource Books--Careers

- The Complete Guide to Environmental Careers, Island Press, Distributed by the CEIP Fund, 1989. Most comprehensive source of case studies, information on skills, training programs, etc. for careers in all environmental areas including solid waste.
- Environmental Career Guide: Job Opportunities with the Earth in Mind, J. Wiley & Sons, ed. Nicholas Basta, 1991.
- Opportunities in Environmental Careers, VGM Career Horizons, Odom Fanning, 1991. Information on wide range of environmental career options.

Resource Books--Composting

- The Art and Science of Composting, BioCycle, 419 State Ave., Emmaus, PA 18049, (215) 967-4135. Guide to composting municipal, industrial and agricultural wastes. Covers composting principles, processes, management, materials and markets. $55.
- Organic Waste Recycling, John Wiley & Sons, Chongrak Polprasert, 1989.

Resource Books--Waste Management and Recycling

- Beyond 25 Percent: Materials Recovery Comes of Age, Institute for Local Self-Reliance (see Association list for contact information), Theresa Allan, Brenda Platt, and David Morris, 1989.
- Beyond 40 Percent: Record-Setting Recycling and Composting Programs, Institute for Local Self-Reliance (see Association list for contact information), Brenda Platt, 1990. Describes outstanding recycling programs throughout the country.
- Cartons, Cans, and Orange Peels--Where Does Your Garbage Go? Clarion Books, Joanna Foster, 1991. Outlines the composition of garbage and trash and discusses various methods of disposing of it with an emphasis on recycling.
- Cleaning Up, Julian Messner, Englewood Cliffs, NJ, Eve and Albert Swertka, 1992. Discusses the problem of trash and what can be done with it, including the partial

solution of recycling.

- Coming Full Circle: Successful Recycling Today, Environmental Defense Fund, (see Associations for contact information), 1988, $20.00. Somewhat dated.
- The Complete Guide to Recycling at Home: How to Take the Responsibility, Save Money, and Protect the Environment, Betterway Publications, Gary Branson, 1991.
- Complete Trash: The Best Way to Get Rid of Practically Everything Around the House, M. Evans & Co., Inc., Norm Crampton, 1989.
- Experiments that Explore: Recycling, Millbrook Press, Brookfield, CT, Martin J. Gutnick, 1992. Uses experiments to demonstrate the effects of dumping solid waste into our environment and explores what can be done about it.
- Garbage and Recycling, Gareth Stevens, Inc., 7317 W. Green Tree Rd., Milwaukee, Wi 53223, Judith Woodburn, 1991. Discusses the solid waste crisis, the causes of landfill crowding, and solutions in recycling various substances.
- Garbage and Recycling, Enslow Publishers, Bloy St. & Ramsey Ave., P.O. Box 777, Hillside, NJ 07205, Kathlyn Gay, 1991. Examines the problem of garbage accumulation in America and different recycling solutions which may prevent the problem from getting worse.
- Garbage: Understanding Words in Context, Greenhaven Press, Inc., P.O. Box 289009, San Diego, Ca 92128-9009, Robert Anderson and JoAnne Buggey, 1991. Opposing viewpoints debate the seriousness of the garbage crises; whether incineration or recycling is the answer; and if using cloth diapers will reduce the garbage problem. Vocabulary exercises teach critical thinking and reading skills.
- The Magic Circle: Recycling in America, Atheneum Publishers, Gordon Bishop, 1991. Discusses recycling and technologies that don't "waste" as a means of controlling the threat of global pollution.
- Mining Urban Wastes: The Potential for Recycling, Worldwatch Institute, 1776 Mass., Ave.NW, Washington DC 20036, (202) 452-1999, Cynthia Pollock, 1987.
- Municipal Waste Disposal, Chilton Book Co, Bela Liptak, 1991.
- Plastics: America's Packaging Dilemma, Island Press, Nancy Wolf and Ellen Feldman, $12.95, 128 pp.
- Plastics Recycling Foundation Annual Report, Plastics Recycling Foundation, 1275 K St. NW Suite 500, Washington DC 20005, (202) 371-5200.
- Promoting Source Reduction and Recyclability in the Marketplace, EPA, RCRA, 1989, free, see toll-free number in Organizations list.
- Recycling, Gloucester Press, New York, Tony Hare, 1991. Discusses methods of recycling metal, plastic, paper, and glass, and why such conservation efforts are important.
- Recycling, Chelsea House Publishers, Rebecca Stefoff, 1991. Examines the evolution of recycling as a concept, its role in controlling the world's trash problems, and possible future developments.
- Recycling, Council on Plastics and Packaging in the Environment, 1275 K St. NW Suite 900, Washington DC 20005, (202) 789-1310.
- Recycling and Incineration: Evaluating the Choices, Island Press, Richard Denison and John Ruston (Environmental Defense Fund), 1990.
- Recycling Glass, Franklin Watts, Inc., Judith Condon, 1991. Discusses the problems caused by the manufacture and disposal of glass products, and proposes methods for recycling them to reduce such threats.
- Recycling: Meeting the Challenge of the Trash Crisis, G. P. Putnam, Virginia Alvin and Robert Silverstein, 1991. Discusses different methods of recycling waste,

associated advantages and problems, and the possible future.

- Recycling Metal, Franklin Watts, Inc., Joy Palmer, 1991. Explains environmental problems that result from the manufacture and disposal of everyday items made of metal and shows how the recycling of these objectives can reduce these threats.
- Recycling Paper: From Fiber to Finished Product, TAPPI Press, Atlanta, Matthew J. Coleman, 1990.
- Recycling PET: A Guidebook for Community Programs, National Assn. for Plastic Container Recovery, 4828 Pkwy. Plaza Blvd. Suite 260, Charlotte, NC 28217, 1-800-NAP-CORP.
- Recycling Plastic, Franklin Watts, Inc., New York, Joy Palmer, 1990. Discusses the environmental problems caused by the manufacture and disposal of plastic products and shows how the recycling of these products can reduce these threats.
- Rush to Burn: Solving America's Garbage Crisis, Island Press, Newsday, 1989. $22.95, 269 pp.
- Salvaging the Future: Waste-Based Production, Institute for Local Self-Reliance (see Associations for contact information), Caroline Rennie and Alair MacLean, 1989.
- Taking Out the Trash A No-Nonsense Guide to Recycling, Island Press, Jennifer Carless, 1992, $16.00, softbound. Covers history, basics, information on common and uncommon recyclables, ideas on reduce, reuse, recycle, reject, setting up a recycling program, what's being done with legislation, a look at the recycling industry and the future of recycling.
- War on Waste: Can America Win Its Battle with Garbage?, Island Press, Louis Blumbert and Robert Gottlieb, $19.95, 325 pp.
- Waste, Steck-Vaughn Co., P.O. Box 26015, Austin, TX, Kay Davies and Wendy Oldfield, 1992. Examines various aspects of waste and pollution, including water waste, water pollution, oil spills, air pollution, rust, and recycling.
- Waste Disposal and Recycling, Gloucester Press, NY, Sue Becklake, 1991. A look at such waste disposal problems as overflowing landfills and hazardous waste and possible solutions for them, primarily recycling.
- Waste Not, Want Not: State and Federal Roles in Source Reduction and Recycling of Solid Waste, Northeast-Midwest Institute, 218 D. Street SE, Washington, DC 20003, Carol Andress, 1989.
- What a Load of Trash!, Millbrook Press, Brookfield, CT, Steve Skidmore, 1990. Humorous illustrations accompany a discussion of the problems of waste disposal and of recycling as one possible solution.
- Where Does Garbage Go? Gareth Stevens, Inc., Isaac Asimov, 1991. Briefly examines how we get rid of the things we throw away, describing some of the problems and solutions of waste disposal.
- Why Waste a Second Chance?: A Small Town Guide to Recycling, National Assn. of Towns and Townships, 1522 K. St. NW, Suite 730, Washington, DC 20005, National Center for Small Communities, 1989.
- Worldwatch Paper 101: Discarding the Throwaway Society, Worldwatch Institute Publications Dept. Massachusetts, Washington DC 20036, John E. Young, 1991, $4.25 pp.

Resource Books--Litter

- A Citizen's Guide to Plastics in the Ocean, Center for Marine Conservation, 1725 DeSales St. NW, Washington, DC 20036, (202) 429-5609, Kathryn O'Hara and Suzanne Iudecello, 1988. $2.00 postpaid.

Resource Books--General Environment

- A Citizens Guide: 101 Ways to Help Heal the Earth, Greenhouse Crisis Foundation, 1130 17th St. NW Suite 630, Washington DC 20036, (202) 466-2823
- Connecting with Nature: Creating Moments that Let Earth Teach, World Peace University, Box 10869, Eugene, OR 97440, Michael J. Coehn, 88 pp. $10.95
- Conservation of Natural Resources, Prentice Hall, Gary A. Klee, 1991.
- Earth Day, Carolrhoda Books Inc., 1-800-328-4929, Linda Lowery, 1991. Tells the story of Earth Day 1970 and 1990 and the activities used to call global attention to environmental problems.
- Earth Day Every Day, Abdo & Daughters, Edina MN, Jill C. Wheeler, 1991. Suggests various ways all of us can help save the environment and preserve the Earth.
- Ecology and Conservation, Gareth Stevens, Inc. (see Ecology Our Living Planet for contact info.), Steven Seidenberg, 1990. Surveys pressing issues of conservation and pollution as they affect the earth.
- Environment in Peril, Smithsonian Institution Press, Anthony B. Wolbarst, ed., 1991.
- Environmental America: The Northwest States, Millbrook Press, D.J. Herda, ed., 1991. Environmental issues and concerns in the Pacific Northwest and steps being taken to counteract damage.
- Environmental Awareness--Solid Waste, Bancroft-Sage Publishers, Inc., 533 Eighth St. S., Naples, FL 33939, (813) 642-5600, M.E. Snodgrass and M.L. Oelerich, 1991. Focuses on ever-growing problem of managing all types of solid waste and hazards to people and environment. Suggests ways readers can help in waste reduction efforts.
- The Environmental Crisis--Opposing Viewpoints, Greenhaven Press, Inc. P.O. Box 289009, San Diego, CA 92128-9009, (619) 485-9549, ed. Neal Bernards, 1991. Presents opposing views on environmental protection/damage includes the ever-growing tide of refuse.
- Environmental Decision Making: A Multidisciplinary Perspective, Van Nostrand Reinhold Co. Inc., ed. Richard Chechile and Susan Carolisle, 1991.
- Fifty Simple Things You Can Do to Save the Earth, The Earth Works Group, 1989.
- This Planet is Mine: Teaching Environmental Awareness and Appreciation to Children, Simon & Schuster, NY, Mary Metzger and Cinthya Whittaker, 1991.

Resource Books--Toxic and Household Hazardous Waste

- A Citizen's Guide to Promoting Toxic Waste Reduction, INFORM, Publications Dept. 381 Park Ave. S., New York, NY 10016, Lauren Kenworthy, Eric Schaeffer, 1989, $15.00, 128 pp.
- Clean and Green: The Complete Guide to Nontoxic and Environmental Safe Housekeeping, Earthkeeping Newsletter, RR 1 Box 69, Thetford Center, VT 05075. Annie Berthold-Bond, 500 recipes for nontoxic cleaning and other household related products. Newsletter provides practical information about effective, accessible environmentally safe products and practices.
- Clearer, Cleaner, Safer, Greener: A Blueprint for Detoxifying Your Environment, Random House Inc., International, Gary Null, 1990, $18.95, 293 pp.
- Healthy Home, Rodale Press, Linda Mason Hunter, 1988. Covers all aspects of attaining a healthy home including less hazardous household products.
- Toxic Waste, Gloucester Press, MY, Tony Hare, 1991. Examines the origins of toxic waste, both in industry and the home, and explains what we can do to avoid some of its dangers.

- Toxic Waste: Earth Alert Series, Maxwell Macmillan International Publishing Group, Clearwater, FL, Susan Gold, 1990, Crestwood House $10.95, 47 pp.

Magazines, Newspapers, Newsletters

- Alliance Exchange, Alliance for Environmental Education, Inc. 3421 M St. NW, Box 1040, Washington, DC 20007, (202) 797-4530. Promotes philosophy and objectives of alliance, to advance all phases of formal and non-formal environmental education. General interest news, reports on curricula, conferences, changes in personnel, activities of organization, discussion of policy, philosophy, controversy surrounding resource management, sustainable economic practices, development/protection of natural resources, energy use and conservation, and geography, quarterly publication, price included in membership or $5 for non-members.
- Becoming an Environmental Professional, CEIP Fund, 68 Harrison Ave., 5th Floor, Boston, MA 02111, (617) 426-4375.
- BioCycle: Journal of Waste Recycling, P.O. Box 351, Emmaus, PA 18049, (215) 967-4135. Focuses on management of city and industry wastes. Monthly, $55.
- The Biosphere, International Soc. for Environmental Education, Ohio State University, 210 Kottman Hall, 2021 Coffey Rd., Columbus, OH 43210, (614) 292-2265. Articles on international environmental education, published 3x/yr, $10.
- Buzzworm: The Environmental Journal, Buzzworm, Inc., 2305 Canyon Blvd. #206, Boulder, CO 80302-5655, (303) 442-1969. Environmental magazine for general audiences, published 6x/year, $18.
- Carrying Capacity News, Carrying Capacity Network (see Associations for contact information). Articles/reviews on links between environmental, population, resource, social and related economic issues, periodic publication, $25.
- Children of the Green Earth Newsletter, Children of the Green Earth, P.O. Box 31550, Seattle, WA 98103, quarterly.
- Clearing Magazine, Environmental Education Project, 19600 S. Molalla Ave, Oregon City, OR 97045, (503) 656-0155. Provides resource materials, teaching ideas, and information for those interested in providing environmental education. Published 5x/year, $10, or comes with membership in the Environmental Education Association of Oregon. (See Associations, and see samples from Clearing in the Ideas section.)
- Council on Plastics and Packaging in the Environment Quarterly and other publications, 1275 K St. NW, Suite 900, Washington DC 20005, (202) 789-1310.
- Cycle/The Waste Paper, Environmental Action Coalition, Inc., 625 Broadway, New York, NY 10012, (212) 677-1601. Information on disposal of solid waste materials, such as paper, used containers, metal and garbage. Carries news of activities of the Coalition, which is dedicated to environmental protection and education, periodic publication, free.
- E Magazine: The Environmental Magazine, Earth Action Network, P.O. Box 5098, Westport, CT 06881, (203) 854-5559. Published 6x/year, $20, $36/2 years, $3.50 single issue.
- Earth Notes, for Educators, Grades K-6, US. Environmental Protection Agency, Communications/Education and Public Affairs, 401 M Street SW (A-107), washington DC 20460. Published February, May, August, November. Open forum for exchange of teaching ideas, comments, brief essays concerning environmental education in elementary grades. First issue Fall 1991.
- Earth Work, Student Conservation Assoc., Inc., (603) 826-4301. Deals with

conservation/environmental career issues, targeting those who seek employment in the environmental field.

- Eco-News: An Environmental Newsletter for Children, Environmental Action Coalition, 625 Broadway, 2nd Floor, New York, NY 10012, (212) 677-1601, periodic publication.
- Environmental Education Guide Series, Institute for Environmental Education, 32000 Chagrin Blvd., Cleveland, OH 44124, (216) 464-1775.
- Garbage: The Practical Journal for the Environment, Old House Journal Corp., 435 9th Street, Brooklyn, NY 11215, (718) 788-1700. Magazine explores environmental issues, somewhat controversial stance, published 6x/year, $21.
- Household Wastes: Issues and Opportunities, Concern, Inc., 1794 Columbia Rd.NW, Washington DC 20009, (202) 328-8160. Also publishes Waste: Choices for Communities.
- Journal of Environmental Education, Heldref Publications, Helen Dwight Reid Educational Foundation, 4000 Albemarle St. NW, Suite 500, Washington DC 20016, (202) 362-6445. Environmental education journal, published quarterly, $47.
- Keep America Beautiful Vision, KAB, Mill River Plaza, 9 W Broad St., Stamford, CT 06902, (203) 323-8987. Promotes the work of the organization, which encourages Americans to "assume more responsibility for improving the physical quality of life in their own communities, reports news of KAB activities. Published quarterly, free.
- KIND News: Kids in Nature's Defense Club, National Association for Humane and Environmental Education, 67 Salem Road, East Haddam. CT 06423-0362, (203) 434-8666. In classroom newsprint magazine for children, published 9x/year, $25 (includes 32 copies per issue).
- Magnet, Steel Recycling Institute, Foster Plaza X, 680 Anderson Dr., Pittsburgh, PA 15220, (412) 922-2722. Free quarterly publication.
- Management of World Wastes, Communication Channels, Inc., 6255 Barfield Rd. Atlanta, GA 30328. Waste removal and disposal magazine. Monthly, $35.
- Marine Debris Newsletter, Center for Marine Conservation, 1725 DeSales, St. NW, Suite 500, Washington DC 20036, (202) 429-5609. Describes efforts aimed at reducing plastic debris and other non-degradable trash in oceans and waterways, published quarterly.
- National Recycling Coalition Newsletter, See NRC in Associations for contact information, quarterly publication.
- NatureScope, Ranger Rick's Nature Club, 8925 Leesburg Pike, Vienna, VA 22184, (703) 790-4000. Periodic publication for teachers.
- North American Association for Environmental Education Newsletter, NAAEE, P.O. Box 400, Troy, OH 45373, (513) 339-6835. Bimonthly publication.
- The Phoenix, Institute of Scrap Recycling Industries, 1627 K St. NW, Suite 700, Washington DC 20006, (202) 466-4050.
- Planet Three - The Earth-Based Magazine for Kids, P3 Foundation, P.O. Box 52, Montgomery, Vt 05470, (802) 326-4002. Educates children 6-12 years old on environmental affairs and ecologically safe practices.
- The Plastic Bottle Report, Plastic Bottle Information Bureau, 1275 K St. NW, Suite 400, Washington DC 20005. Covers recycling activities/technology, new plastic bottle applications, environmental concerns, new literature reviews, quarterly, free.
- Plastics Recycling: A Strategic Vision, Plastics Recycling Foundation, 1275 K Street NW, Suite 500, Washington, DC 20005.

- Plastics Recycling Report, Plastics Recycling Institute, Rutgers Univ., P.O. Box 909, Piscataway, NJ 08854. Provides overview of current plastics recycling technology.
- Ranger Rick, National Wildlife Federation, 1400 16th St. NW, Washington DC 20036-2266, 1-800-432-6564. Environmental/natural history magazine for children ages 6-12, $15.
- Recycling Plastic Containers, National Assn. for Plastic Container Recovery, 1-800-NAPCORP. Also other publications.
- Recycling Today, GIE Inc., 4012 Bridge Ave., Cleveland, OH 44113, (216) 961-4130. Magazine covering recycling of secondary raw materials and solid waste management, monthly $28.
- Resource Recovery Report, 5313 38th St. NW, Washington DC 20015, (202) 362-6034. Monthly review of resource recovery progress, includes state-by-state, market-by-market and national news on legislative progress.
- Resources for the Future, Inc.--Resources, 1616 P St. NW, Washington DC 20036. Features natural resources and environmental articles on renewable resources, quality of the environment, food and agriculture policy, energy, climate, risk assessment and management, quarterly publication, free.
- Reuse/Recycle, Technomic Publishing Co. Inc., 851 New Holland Ave., P.O. Box 3535, Lancaster, PA 17604-3535, 1-800233-9936. Information on new processes, machinery, uses for industrial and municipal recycling, news of energy recovery, recycling and other events, updates on legislation, energy industry changes, pollution/recycling problems facing scientists and industry, monthly, $125/year.
- Scrap Processing and Recycling Magazine, Institute of Scrap Recycling Industries (see Associations list for contact information), periodic publication.
- Sierra, and other publications, Sierra Club, 730 Polk St., San Francisco, CA 94109, (415) 776-2211. Provides essays on wilderness, environmental politics, conservation movement, outdoor adventure, book reviews, young readers section, etc., Bimonthly, price included in membership dues or $15/year for nonmembers.
- Solid Waste and Power: The Waste-to-Energy Magazine, HCI Publications, 410 Archibald St., Suite 100, Kansas City, MO 64111, (816) 931-1211. Reports on waste-to-energy field, information on environmental considerations and proven approaches, published 6x/year, $49.
- Talking Leaves, Institute for Earth Education, P.O. Box 288, Warrenville, Il 60555, (708) 393-3096. Journal covering programs and events dealing with earth and ecology education, quarterly, price included in membership dues.
- Truly Loving Care: For Our Kids and for Our Planet, Natural Resources Defense Council (See Associations for contact information). Quarterly publication, $10/yr for members, $15 for non-members.
- Waste Age: The Authoritative Voice of Waste Systems and Technology, Nat'l. Solid Wastes Management Assn., 1730 Rhode Island Ave. NW, Suite 1000, Washington DC 20036, (202) 861-0708. News on solid and hazardous wastes, recycling, and pollution control, monthly, free ($45 mail).
- Waste Paper, Environmental Action Coalition, 625 Broadway, (Bleecker/Houston), New York, NY 10012, (212) 677-1601.
- Waste Tech News: The Newspaper for the Waste and Pollution Control Industries, Schouweiler Communications Group, 131 Madison St., Denver, CO 80206-5427, (303) 394-2905, Published every other week, free if qualified, $25 for others.
- Waste Watchers, Waste Watch, P.O. Box 298, Livingston, KY 40445

- The Whole Earth Catalog (and other publications), Point Foundation, 27 Gate Five Rd., Sausalito, Ca 94965, (415) 332-1716
- Worldwatch: A Magazine of the Worldwide Institute, Worldwatch Inst., 1776 Massachusetts Ave NW, Washington DC 20036, (202) 452-1999. Magazine on economic and ecological development worldwide, Published 6x/year, $12.00.
- Your Big Backyard, National Wildlife Federation, 100 16th St. NW, Washington, DC 20036-2266, 1-800-432-2266. Environmental/natural history magazine for children ages 3-5, $12.00.

Catalogs, Indexes, Almanacs, etc.

- 1992 Earth Journal, ed. J.E. Daniel et. al., Buzzwork Books, 1991. Articles on environmental issues, directory to resources on environmental issues, data and Q & A's on various topics
- 1991-92 Green Index, Bob Hall and Mary Lee Kerr, Island Press, 1991. State-by-state guide to nation's environmental health.
- 1992 Information Please Environmental Almanac, World Resources Institute, Houghton Mifflin, 1992. Highlights important environmental events each year, discusses important environmental issues, and provides statistics and facts regarding the whole range of environmental topics, including country-by-country profiles.
- American Recycling Market Directory/Reference Manual, Recoup Publishing Ltd., P.O. Box 577, Ogdensburg, NY 13669, 1-800-267-0707. Lists approx 20,000 recycling companies, centers, state and federal government agencies responsible for recycling, industry associations, etc. Annual, produced in January. Costs $125.
- Directory of Environmental Information Sources, Government Institutes, Inc., 966 Hungerford Dr., Suite 24, Rockville, MD 20850, (301) 251-9250, Ed. Thomas F.P. Sullivan, 1990.
- The Earth Care Annual 1991, Rodale Press Inc., 33 E Minor St., Emmaus, PA 18098, Russel Wild, 1991, $17.95, 235 pp.
- The Earth Education Sourcebook, Institute for Earth Education (see Associations for contact information.)
- Ecologue: The Environmental Catalogue and Consumer's Guide for a Safe Earth, Prentice Hall Press, 1 Gulf and Western Plaza, New York, NY 10023, Bruce N. Anderson, Ed., 1990. Has an excellent section on items for kids, and lots of interesting facts about the environment presented as notes throughout the catalog.
- Educational Materials, Oregon State University Extension Service and Oregon Agricultural Experiment Station. Many materials can be picked up through county extension offices, or order materials from Publications Orders, Agricultural Communications, Oregon State University, Administrative Services A422, Corvallis, OR 97331-2119, (503) 737-2513. Includes materials on home gardening and composting, including the Master Gardener program. In Portland Metro area, OSU Energy Extension also co-sponsors the Master Recycler Program.
- The Encyclopedia of Environmental Issues, Facts on File, Inc., 460 Park Ave. S., New York, NY 10016, William Ashworth, ed., 1991.
- The Environment Resources for Students and Teachers, Paragon Books for Education, P.O. Box 1708, Marysville, WA 98270-1708. Distributor, multiple quantity discounts, examples of waste-related titles include Garbage! Where It Comes From, Where It Goes (see book list).
- The Environmental Address Book: How to Reach the Environment's Greatest Champions and Worst Offenders, Perigee Books, Michael Levine, ed., 1991. Over

2,000 names/ addresses of organizations, agencies, individuals and business concerned with the state of the world's environment.

- Environmental Resource Compendium, 1990: The Year of the Environment, Public Broadcasting System, Elementary & Secondary Service, Dept. Comp, 1320 Braddock Place, Alexandria, VA 22314, (703) 739-5038 ($10.00). Lists public television activities and broadcasts supporting the 1990 Year of the Environment. Includes broadcast programming, telecourses, public service announcements, non-broadcast programming, slide shows and filmstrips, and other resource materials available for K-12 education assistance.
- Gale Environmental Sourcebook A Guide to Organizations, Agencies, and Publications, ed. Karen Hill and Annette Piccirelli, Gale Research Inc., 1992 (1st edition). Most comprehensive directory of organizations, government agencies and programs, research facilities and educational programs, publications and information services, corporate contacts and environmental products, scholarships and awards concerning the environment. Provides descriptive and contact information on approximately 9,000 current resources.
- The Green Consumer, Penguin USA, 1633 Broadway, New York, NY 10019, John Elkington, Julia Hailes, and Joel Makower, 1990.
- Green Earth Resource Guide: A Comprehensive Guide about Environmentally-Friendly, Blue Bird Publishing, 1713 E. Broadway, # 306, Tempe, AZ 85282, Cheryl Gorder, 1990.
- The Green Pages: Your Everyday Shopping Guide to Environmentally Safe Products, Random House, The Bennett Information Group, 1990.
- Island Press Environmental Sourcebook, Books for Better Conservation and Management, Order catalog or publications by calling 1-800-828-1302. Examples of waste-related titles include (see annotations under Resource Books)
    - Taking Out the Trash
    - Plastics America's Packaging Dilemma
    - War on Waste
    - Getting at the Source Strategies for Reducing Municipal Solid Waste
    - The Complete Guide to Environmental Careers
- The Nature Directory: A Guide to Environmental Organizations, Walker & Co., Susan D. Lanier-Graham, 1991.
- The Northwest Greenbook: A Regional Guide to Protecting and Preserving Our Environment, Sasquatch Books, Seattle, Jonathan King, 1991.
- Promoting Recycling to the Public, National Soft Drink Association, 1101 16th St. NW, Washington, DC 20036, (202) 463-6770. Waste recycling and anti-litter programs. Currently being revised, next edition due fall 1993.
- Public Interest Group Directory--Pacific Northwest, Environmental Protection Agency Region 10, Attn: Region 10 Public Information Center, 1200 6th Ave. Mail Stop MD-107, Seattle, WA 98101, (206) 553-4973. Voluntary organizations, state, local, provincial and federal government agencies responsible for environmental and pollution control in Alaska, Idaho, Oregon, and Washington. Irregular, free.
- Recycling Centers Directory, American Business Directories, Inc., American Business Information, Inc., 5711 S. 86th Circle, Omaha, NE 68127, (402) 593-4600. Lists 5,569 recycling centers nationwide. Annual publication, $215 (discount for standing order). Also publishes Waste Reduction/Disposal/Recycle Service Industries Directory, annual publication for $105.00.
- Recycling: Recent Publications, Vance Bibliographies, 112 N. Charter St,

Monticello, IL 61856, (217) 762-3831, Mary Vance, 1990.

- Shopping for a Better Environment: A Brand Name Guide to Environmentally Responsible Shopping, Meadowbrook Press, Inc., Laurence Tasaday, 1991.
- Shopping for a Better World, Council on Economic Priorities, 30 Irvin Pl., New York, NY 10003. Annual guide to socially responsible supermarket shopping.
- Solid Waste Education Recycling *Directory*, Lewis Publishers, Teresa Jones, et al., 1990. Lists state-by-state activities in solid waste and recycling education. Somewhat out of date because many state legislative actions took place in 1990, and efforts resulting from legislation are not included in the directory.
- Solid Waste Recycling: The Complete Resource Guide, Bureau of National Affairs, Washington DC, 1990.
- State of the World--1991, Worldwatch Institute, Lester R. Brown, 1991, $10.95, 254 pp. Annual review of environmental issues world-wide.
- Your Resource Guide to Environmental Organizations, Smiling Dolphins Press, 4 Segura, Irvine, CA 92715. 150 nonprofit environmental organizations. 1991, $15.95.

Selected Associations--Waste Management and Recycling

- The Aluminum Association, 818 Connecticut Avenue NW, Washington DC 20006
- Aluminum Recycling Association (ARA), 1000 16th St. NW, Suite 603, Washington DC 20036, (202) 785-0951. Members are producers of aluminum alloys from scrap aluminum.
- American Paper Institute, 260 Madison Avenue, New York, NY 10016
- Asphalt Recycling and Reclaiming Association, 3 Church Circle, Suite 250, Annapolis, Md 21401, (301) 267-0023. Promotes asphalt recycling.
- Association of Battery Recyclers, Sanders Lead Co. Corp., Sanders Rd., P.O. Drawer 707, Troy, AL 36081, (205) 566-1563. Provide information, conduct studies, compiles statistics about safe battery recycling.
- Association of Oregon Recyclers, P.O. Box 15279, Portland, OR 97215, (503) 255-5087. Oldest state recycling organization, provides information and assistance for individuals, organizations, companies, agencies, etc. to improve recycling programs in Oregon. Sponsors 2 annual conferences, one focused on recycling education, an annual youth summit, and information on recycling markets in Oregon. Membership includes monthly newsletter.
- Association of State and Territorial Solid Waste Management Officials, 444 N. Capitol St. NW, Suite 388, Washington DC 20001 (202) 624-5828. Conducts research, training, analysis on critical issues in solid waste management. Works to coordinate governmental sharing.
- Coalition for Responsible Waste Incineration, 1330 Connecticut Ave. NW, Suite 300, Washington DC 20036, (202) 659-0060. Promotes responsible incineration of industrial waste as part of integrated waste management strategy.
- Coalition on Resource Recovery and the Environment, U.S. Conference of Mayors (Shaub) 1620 I St. NW, Suite 600, Washington DC, (202) 293-7330, Dr. Walter M Shaub, Technical Dir. Local and regional governments and private communities provide information about resource recovery, without assuming position regarding appropriateness of one technology. Supports integrated utilization of multiple technologies for successful waste management.
- Committee for Environmentally Effective Packaging, 1000 Connecticut Ave., Suite 304, Washington DC 20036, (202) 659-4805. Corporations/trade associations conduct

educational and lobbying activities on the use of polystyrene in food service packaging.

- The Council for Solid Waste Solutions, 1275 K Street NW, Suite 500, Washington DC 20005, 1-800-243-5690. Environmental task force of companies in plastics industry, a program of the Society of The Plastics Industry, offers education materials on plastics in the waste stream, including How to Set Up a School Recycling Program, 12 minute video, The Resource Revolution about the plastics recycling process (grades 7-12), includes a teachers guide. Also fact and classroom activity sheets, one free video/booklet per school.
- Council on Plastics and Packaging in the Environment, 1275 K St. NW, Suite 900, Washington DC 20005, (202) 789-1310. Plastic packaging manufacturers, suppliers, marketers, recyclers and trade associations work to increase awareness of solid waste management problems, develop and support balanced combination of source reduction, recycling, waste-to-energy recover and landfilling. Resource for information on plastic and other packaging.
- Environmental Action, 1525 New Hampshire, Ave. NW, Washington, DC 20036, (202) 745-4870. Lobbies for passage of strong environmental laws, works directly with citizen groups on recycling and toxic pollution.
- Environmental Action Coalition, 625 Broadway, 2nd Fl., New York, NY 10012, (212) 677-1601. Educates public about nature and scope of major environmental problems, provides resource center to develop positive solutions, motivate public to become involved. Current focus on source-separation recycling, monitoring resource recover installations, develop environmental education materials for children and adults, clearinghouse for environmental services in urban areas nationwide.
- Environmental Action Foundation, 1525 New Hampshire Ave. NW, Washington, DC 20036, (202) 745-4870. Environmental education and research organizations serves as resource for citizens and organizations in areas of energy policy, toxic substances and solid waste reduction. Advocates recycling, source reduction and control of hazardous waste among others.
- Environmental Hazards Management Institute, 10 New Market Rd., P.O. Box 932, Durham, NH 03824, (603) 868-1496. Information clearinghouse on hazardous materials issues for individuals, business and industry, publishes a newsletter and interactive slide wheels on household hazardous waste and recycling.
- Franklin Associates, Ltd., Suite 108, 4212 W. 83rd Street, Prairie Village, KS 66209. Consultants who conduct the waste composition studies for the EPA
- The Garbage Project, University of Arizona, Building 30, Tucson, AZ 85721, (602) 621-2585. Excavates garbage from landfills in order to understand modern society from an archaeological perspective; provides information packets on results from research on landfills and recycling, slides of garbage excavated from landfills and household hazardous waste. Project coordinator writes column for Garbage.
- Glass Packaging Institute, Suite 1105L, 1801 K Street NW, Washington DC 20006.
- Governmental Refuse Collection and Disposal Association, 8750 George Ave. Suite 140, P.O. Box 7219, Silver Spring, MD 20910, (301) 585-2989, 1-800-586-4723. Public and private waste management officials work to improve solid waste management services via training, education, technical assistance, and technology transfer, maintains 6,000 document library on solid and hazardous waste management.
- Grocery Manufacturers of American, Suite 800, 1010 Wisconsin Avenue NW, Washington DC 20007.
- Institute for Local Self-Reliance, 2425 18th St. NW, Washington DC 20009, (202)

232-4108. Provides technical assistance, research, educational materials, and data about recycled materials and energy efficiency.

- Institute of Scrap Recycling Industries, 1627 K St. NW, Suite 700, Washington, DC 20006, (202) 466-4050. Conducts research and education programs for individuals and organizations engaged in metal scrap recycling. Division: Paper Stock Institute, focuses on recycling paper and paperboard.
- Keep America Beautiful, Mill River Plaza, 9 W Broad St., Stamford, CT 06902, (203) 323-8987. Sponsors community-level cooperation and education regarding improving the physical quality of life, especially waste handling. Sponsors, competitions, awards programs, national Keep American Beautiful month, etc.
- National Association of Solvent Recyclers, 1333 New Hampshire Ave. NW, Suite 1100, Washington DC 20036, (202) 463-6956. Firms engaged in recycling/reclaiming used industrial solvents, fosters energy conservation, monitors regulatory action.
- National Food Processors Association, 1401 New York Avenue NW, Washington DC
- National Oil Recyclers Association, 805 15th St. NW, Suite 900, Washington DC 20005, (202) 962-3020. Represents interests of oil recyclers to EPA.
- National Recycling Coalition, 1100 30th St. NW, Washington DC 20007, (202) 625-6406. Individuals and organizations working together to encourage recovery, reuse and conservation of materials and energy and to promote benefits of recycling. Acts as information network for persons interested in recycling, answers requests for information, operates speakers' bureau and research library, bestows awards.
- National Resource Recovery Association, 1620 I St. NW, Washington DC 20006, (202) 293-7330. Government and public agencies, private sector organizations, and individuals involved in resource recovery. Encourages development of recycling programs and urban waste energy systems to recover energy, acts as forum for information exchange, provides training and technical services.
- National Solid Waste Management Association, 1730 Rhode Island Ave. NW, Suite 1000, Washington DC 20036, (202) 659-4613. Maintains speakers' bureau, research, statistics, competitions and awards related to solid waste management.
- Partnership for Plastics Progress, 1275 K Street NW, Washington DC 20005.
- Society of the Plastics Industry, 1275 K Street NW Suite 400, Washington DC 20005.
- Plastics Recycling Foundation, 1275 K St. NW, Suite 500, Washington DC 20005, (202) 371-5200. Suppliers, manufacturers and users of plastics materials and products sponsor research in recovery and reuse of plastics products (mainly packaging). Maintains speakers' bureau, research grants, training on technology transfer.
- Solid Waste Composting Council, Suite 900, 601 Pennsylvania Avenue NW, Washington DC 20004.
- Steel Recycling Institute, Foster Plaza X, 680 Anderson Dr., Pittsburgh, PA 15220, (412) 922-2772, 1-800-876-7274. Steelmaking companies provide information and technical analyses to members and the public regarding collection, preparation and transportation of steel/bimetal can scrap. Research and development, advance general knowledge of issues, sponsors competitions, awards, maintains library/speakers' bureau, offers children's services and educational programs. Provides free materials for teachers and students, including a curriculum program for grades 5-8 entitled Steel--American's Most Recycled Material and the ROSCOE Learning Series.
- U. S. Environmental Protection Agency, 401 M Street SW, Washington DC 20460 (see curriculum guide list Let's Reduce and Recycle for toll-free order number).

- Waste Watch, P.O. Box 298, Livingston, KY 40445. Volunteer group of citizens in various sectors promotes constructive citizen action and participation in waste management issues problem solving, public information and education, consulting work/training, maintains resource library on waste issues and energy conservation.
- World Watch Institute, 1776 Massachusetts Avenue NW, Washington DC 20036.

Selected Associations--Toxic and Household Hazardous Waste

- Bio-Integral Resource Center, P.O. Box 7414, Berkeley, CA 94707, (415) 524-2567. Information clearinghouse on newest methods of less toxic pest control.
- Center for Safety in the Arts (CSA), 5 Beekman St., Suite 1030, New York, NY 10038. Information clearinghouse for research and education on hazards in the visual/performing arts and school art programs.
- Citizens Clearinghouse for Hazardous Waste, P.O. Box 926, Arlington, VA 22216, (703) 276-7070. Grassroots organization promoting public awareness and legislative involvement in hazardous waste issues.
- Household Hazardous Waste Project, 1031 E. Battlefield, Suite 21, Springfield, MO 65807, (417) 899-5000. Develops and promotes HHW education; provides training, consultation, educational materials and a referral information service.
- Waste Watch Center, Dana Duxbury and Associates, 16 Haverhill St., Andover, MA 01810 (508) 470-3044. Considered one of the leading sources for HHW management information in the country, sponsors national HHW conference, detailed bibliography of publications.
- Washington Toxics Coalition, 4516 University Way NE, Seattle, WA 98105, (206) 632-1545. Provides information on effective alternatives to hazardous products. Fact sheets on alternatives available through the Coalition, or through DEQ or METRO.

Selected Associations--Environmental

- America the Beautiful Fund (ABF), 210 Shoreham Bldg. NW, Washington DC 20005, (202) 638-1649, Paul Bruce Dowling, Exec. Dir. Offers recognition, technical support and small seed grants to individuals and community groups to initiate new local action projects to improve the quality of the environment. Presents National Recognition Awards for superior projects in the U.S.
- Better World Society, 1100 17th St. NW, Washington DC 20036. Promotes public awareness of worldwide environmental issues.
- Carrying Capacity Network, 1325 G St. NW, Suite 1002, Washington DC 20005-3104, (202) 879-3044, Stephen Mabley, Network Coordinator. Facilitates cooperation/sharing among activist groups, forum for development/exchange of information on carrying capacity of the earth (number of individuals resources can support with degradation of physical, ecological, cultural, and social environments).
- CEIP Fund, 68 Harrison Ave., 5th Fl., Boston, MA 02111, (617) 426-4375. Provides paid full-time internships for upper-level and graduate students with private industry, government agencies and non-profit organizations in conservation services, public policy and community development, and technical services. Publishes book on careers in environmental areas.
- Citizens for a Better Environment, 407 S. Dearborn, Suite 1775, Chicago, IL 60605, (312) 939-1530. Citizens concerned with environmental protection. Research, public information and education, advocacy, technical assistance to community-based organizations.
- Concern, 1794 Columbia Rd. NW, Washington DC 20009, (202) 328-8160. Provides

environmental information to individuals and groups and encourages community-level environmental action.

- The Cousteau Society, 930 W. 21st St., Norfolk, VA 23517, (804) 627-1144. Environmental education organization dedicated to protection and improvement of quality of life for present and future generations. Conducts education, research and evaluation of man-nature interactions.
- Elmwood Institute, P.O. Box 5765, Berkeley, CA 94705-0765, (415) 845-4595. Forum for research, formulation, discussion, practical application of "Ecothinking", awareness of global interdependence, ecological wisdom, etc. Intellectual resource for the Green movement, conducts workshops, seminars, etc.
- Environmental Defense Fund, 257 Park Ave. S., New York, NY 10010, (212) 505-2100. Public interest organization promotes research, public education and administrative and legislative action toward the protection and improvement of environmental quality.
- Friends of the Earth, 218 D St. SE, Washington DC 20003, (202) 544-2600. Lobbies congress, issues publications to further environmental goals.
- Global Tomorrow Coalition, 1325 G St. NW, Washington DC 20005, (202) 628-4016. Studies global trends in population growth, use of natural resources, and the environment.
- Green Seal, P.O. Box 1694, Palo Alto, CA 94302 (415) 327-2200. Developing an unbiased criteria to evaluate environmental impacts of consumer products. Evaluation will use life cycle analysis (raw material to manufacturing through consumer usage to recycling or disposal), and will publish list of products awarded "the Green Seal".
- Institute for Earth Education, P.O. Box 288, Warrenville, IL 60555, (708) 393-3096. International institute of environmental educators, provides programs, consulting services, etc.
- Institute for Environmental Education, 32000 Chagrin Blvd., Cleveland, OH 44124, (216) 464-1775. Seeks to improve environmental education in schools by providing information, sponsoring summer internships for teachers.
- Izaak Walton League of America, 1401 Wilson Blvd., Level B. Arlington, VA 22209, (703) 528-1818. Educates the public to conserve maintain, protect and restore environment and natural resources.
- Kids for a Clean Environment, P.O. Box 158254, Nashville, TN 37215, (615) 331-0708. Children's environmental organization provides information, projects for kids to make positive impact on the environment.
- League of Women Voters Education Fund, 1730 M St. NW, Washington DC 20036.
- National Appropriate Technology Assistance Service, U. S. Department of Energy, P.O. Box 2525, Butte, MT 59702-2525, 1-800-428-2525. Established in 1984, NATAS helps individuals, small businesses, federal, state and local governments, non-profits and other groups implement projects that use renewable energy or energy efficiency. Provides technical engineering and commercialization assistance, referral to appropriate sources, and provides information and materials on teaching about energy in schools.
- National Geographic Society, 17th and M Sts. NW, Washington DC 20036, (202) 857-7000. Scientific educational nonprofit organization supports environmental research.
- Natural Resources Defense Council, 40 W. 20th St., New York, NY 10011, (212) 727-4412. Lawyers, scientists, public health specialists and planners dedicated to the wise management of natural resources through research, public education and

development of public policies. Monitors regulatory agencies to ensure that public interest is considered. Produces "A kid's guide to protecting the planet" coloring and activity guide.

- Rainforest Alliance, 270 Lafayette St., Suite 512, New York, NY 10012, (212) 941-1900. Encourages attitudes and actions to protect world-wide rainforests through education, public awareness, speakers' bureau, projects to involve individuals.
- Ranger Rick's Nature Club, 8925 Leesburg Pike, Vienna, VA 22184, (703) 790-4000. Children's division of National Wildlife Federation, teaches young children to know and respect living things, conservation, and wise use of natural resources.
- Renew America, 1400 Sixteenth Street NW Suite 710, Washington DC 20036, (202) 232-2252. Nonprofit educational organization providing national clearinghouse for successful environmental programs. Publications include Environmental Success Index (directory of over 1200 verified model programs), and a State of the States report, which ranks states according to environmental achievements.
- Rocky Mountain Institute, 1739 Snowmass Creek Rd., Old Snowmass, CO 81654, (303) 927-3128. Promotes efficient and sustainable use of resources, including use of recycled building materials.
- Sierra Club, 730 Polk St., San Francisco, CA 94109, (415) 776-2211. Individuals concerned with relationships between people and nature, promotes protection and conservation of natural resources through education, political action campaigns, influence public policy at all levels, schedules outings, presents awards, maintains library on environmental topics.
- The Wilderness Society, 900 17th St. NW, Washington DC 20006-2596, (202) 833-2300. Works to establish the land ethic as basic element of American culture and philosophy, education on broader wilderness preservation and land protection constituency. Focuses on federal, legislative and administrative actions affecting public lands. Programs include grass roots organizing, lobbying, research and public education, presents annual awards, compiles statistics.
- World Wildlife Fund, 1250 24th St. NW, Washington DC 20037, (202) 293-4800. Seeks to protect the biological resources upon which human well-being depends, emphasizes preservation of endangered wildlife, plants and habitat. Maintains library, supports projects and services of various organizations, individuals, groups, administers J. Paul Getty Wildlife Conservation Prize.

Selected Associations--Educational

- Environmental Education Association of Oregon, P.O. Box 40047, Portland, OR 97240, 1-800-322-3326. Local affiliate of the North American Environmental Education Association, sponsors teacher training, annual conference, and grants. Membership includes a subscription to Clearing magazine (see order form in Ideas).
- Environmental Education Network, 1-800-322-3326. Coalition of organizations, agencies, and groups interested in improving environmental education communication and resource sharing. 800 number responds to requests for information about curriculum, materials, resources, contacts, etc. throughout Oregon with referrals to appropriate access points for materials, local contacts/resources. 1993-94 emphasis is on waste education.
- National Science Teachers Association, Publications, 1742 Connecticut Avenue NW, Washington DC 20009, (202) 328-5800. Largest science teachers association in the

U.S. working to improve quality of science education, publishes educational products and activity books grades K-college. Free catalog, materials for a fee.

- North American Association for Environmental Education, P.O. Box 400, Troy, OH 45373, (513) 339-6835, Educators and interested individuals and organizations promote and coordinate environmental education programs at all levels, disseminate information, provide technical assistance, promote communication and networking regarding environmental education, presents annual awards for environmental education.
- Oregon Council for the Social Studies, P.O. Box 2131, Salem, OR 97308-2131.
- Oregon Science Teachers Association, Oregon affiliate of NSTA, Ray Thiess, Executive Director, Oregon Department of Education, 700 Pringle Pkwy SE, Salem, OR 97310-0290, (503) 378-3602.

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